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Forests and Grasslands

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# **Final Environmental Impact Statement**

## **for Allotment Management Planning in the Fall River West and Oglala Geographic Areas**

**Pine Ridge and Fall River Ranger Districts  
Nebraska National Forests and Grasslands  
Dawes and Sioux Counties, Nebraska  
Fall River County, South Dakota**



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**Final Environmental Impact Statement**  
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**Pine Ridge and Fall River Ranger Districts**  
**Nebraska National Forests and Grasslands**

**Dawes and Sioux Counties, Nebraska**  
**Fall River County, South Dakota**

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**Abstract:** The Pine Ridge and Fall River Ranger Districts propose to continue permitted livestock grazing on seventy-six allotments in the Oglala and Fall River West geographic areas (GAs) and to do so using adaptive management. This final environmental impact statement evaluates the following three alternatives for managing livestock grazing in the GAs and discloses the predicted effects. Chapter 2 contains complete descriptions of the alternatives. Chapter 3 discusses the effects of the alternatives on resources in project area.

- ♦ Proposed action (alternative 3) – Livestock grazing with adaptive management.
- ♦ Alternative 1 – No action/No livestock grazing. Under this alternative, domestic livestock grazing would be discontinued on all allotments.
- ♦ Alternative 2 – No change/Current livestock grazing management. Under this alternative, livestock grazing would continue on all allotments as currently prescribed in existing allotment management plans (AMPs).

An evaluation of livestock grazing management was needed because the desired conditions are not being met for resources in some areas and there are opportunities to improve the efficiency of livestock grazing management in the two GAs. There is also a need to review existing livestock management strategies and, if necessary, update them to implement LRMP direction and meet the requirements of section 504 of Public Law 104-19 (Rescissions Act, signed 7/27/95).

# Table of Contents

## Summary

<b>Chapter 1 Purpose of and Need for Action .....</b>	<b>1-1</b>
<i>Changes Between Draft and Final.....</i>	<i>1-1</i>
<i>Background.....</i>	<i>1-1</i>
<i>Purpose and Need.....</i>	<i>1-3</i>
<i>Proposed Action.....</i>	<i>1-4</i>
Decision Framework .....	1-5
Public Involvement .....	1-5
<i>Other Related Efforts.....</i>	<i>1-6</i>
<b>Chapter 2 Alternatives, Including the Proposed Action .....</b>	<b>2-1</b>
<i>Changes Between Draft and Final.....</i>	<i>2-1</i>
<i>Alternatives Considered in Detail.....</i>	<i>2-2</i>
Alternative 1 – No Action/No Livestock Grazing.....	2-2
Alternative 2 – No Change/Current Livestock Grazing Management .....	2-2
Alternative 3 – Proposed Action/Livestock Grazing with Adaptive Management .....	2-8
<i>Design Features.....</i>	<i>2-25</i>
<i>Monitoring .....</i>	<i>2-28</i>
<i>Alternatives Considered but Eliminated from Detailed Study .....</i>	<i>2-30</i>
<i>Comparison of Alternatives .....</i>	<i>2-30</i>
<b>Chapter 3 Affected Environment and Environmental Consequences .....</b>	<b>3-1</b>
<i>Changes Between Draft and Final.....</i>	<i>3-1</i>
<i>Introduction .....</i>	<i>3-1</i>
<i>Rangeland Vegetation.....</i>	<i>3-5</i>
<i>Rare Plants and Rare Plant Communities .....</i>	<i>3-15</i>
<i>Endangered, Threatened, Proposed, Candidate, Sensitive, and Management Indicator Species.....</i>	<i>3-21</i>
<i>Climate Change .....</i>	<i>3-40</i>
<i>Water Quality and Soil Resources .....</i>	<i>3-41</i>
<i>Cultural Resources .....</i>	<i>3-45</i>
<i>Paleontological Resources .....</i>	<i>3-47</i>
<i>Recreation Resources .....</i>	<i>3-49</i>
<i>Social and Economic Resources .....</i>	<i>3-54</i>
<i>Short-term Uses and Long-term Productivity.....</i>	<i>3-62</i>
<i>Irreversible and Irretrievable Commitments of Resources .....</i>	<i>3-63</i>
<i>Cumulative Effects .....</i>	<i>3-63</i>
<i>Other Required Disclosures.....</i>	<i>3-63</i>
<b>Chapter 4 Consultation and Coordination .....</b>	<b>4-1</b>
<i>Preparers and Contributors.....</i>	<i>4-1</i>
<i>Agencies, Organizations, and Individuals Contacted.....</i>	<i>4-1</i>

## Appendix A – 2001 LRMP Direction

## Appendix B – Maps of improvements under alternative 2 (existing condition) and alternative 3 (proposed action)

## Appendix C – Allotment maps

## Appendix D – Literature cited

## Appendix E –Comments and Responses

### List of Figures and Tables

Figure 1-1. Project vicinity map .....	1-2
Figure 3-1. Share of employment, by industry, three-county study area .....	3-55
Table 1-1. Oglala GA desired and current condition for seral stage.....	1-4
Table 1-2. Oglala GA desired and current condition for structure.....	1-4
Table 1-3. Fall River West GA desired and current condition for seral stage. ....	1-4
Table 1-4. Fall River West GA desired and current condition for structure. ....	1-4
Table 2-1. Current management (alternative 2) for Oglala GA allotments and pastures.....	2-3
Table 2-2. Current management (alternative 2) for Fall River West GA allotments.....	2-6
Table 2-3. Potential adaptive management actions available for all allotments in the Oglala and Fall River West GAs .....	2-8
Table 2-4. Oglala GA proposed actions to be implemented immediately and adaptive management actions that may be implemented in the future.....	2-10
Table 2-5. Fall River West GA proposed actions to be implemented immediately and adaptive management actions that may be implemented in the future. ....	2-17
Table 2-6. Design features to reduce or eliminate impacts from the proposed actions.....	2-25
Table 2-7. Monitoring to be conducted under alternative 3.....	2-29
Table 2-8. Effects summary by alternative for the entire project area and for the Fall River West and Oglala GAs separately.....	2-30
Table 3-1. Past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis for allotment management planning in the Fall River West and Oglala GAs.....	3-4
Table 3-2. Oglala GA desired and current condition for seral stage.....	3-7
Table 3-3. Oglala GA desired and current condition for structure.....	3-7
Table 3-4. Fall River West GA desired and current condition for seral stage. ....	3-11
Table 3-5. Fall River West GA desired and current condition for structure.....	3-11
Table 3-6. Federally listed species for Dawes and Sioux Counties, Nebraska and for Fall River County, South Dakota .....	3-22
Table 3-7. Canopy cover requirements and areal extent for three sage-grouse habitat types.....	3-23
Table 3-8. Results of sage-grouse monitoring from 1991 through 2011.....	3-23
Table 3-9. Summary of biological determinations for endangered, threatened, and candidate species.....	3-24
Table 3-10. Region 2 sensitive species considered in this analysis.....	3-26
Table 3-11. Swift fox survey results, 2008 through 2010.....	3-28
Table 3-12. Summary of biological determinations for sensitive species.....	3-30
Table 3-13. Range condition class/seral stage in the project area.....	3-42
Table 3-14. Approximate chronology for the project area.....	3-45
Table 3-15. Acres and percent of each geographic area in the SIO areas.....	3-50

Table 3-16. Acres and percent of project area in each ROS class. ....	3-50
Table 3-17. Proposed improvements that could affect SIO in each GA. ....	3-52
Table 3-18. Percent of population below the poverty level, all ages. ....	3-58
Table 3-19. Economic efficiency by alternative. ....	3-61
Table 3-20. Economic impact of national grasslands grazing in the project area. ....	3-62

# **Chapter 1**

## **Purpose of and Need for the Action**

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Background

Purpose and Need for Action

Proposed Action

Decision Framework

Public Involvement

Issues

Other Related Efforts

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# Summary

The Pine Ridge and Fall River Ranger Districts propose to continue permitted livestock grazing on seventy-six allotments in the Oglala and Fall River West geographic areas (GAs) and to do so using adaptive management to meet or move toward desired conditions in a timely manner.

The project was initially identified in the quarterly schedule of proposed actions (SOPA) for the Nebraska National Forests and Grasslands starting in 2007. The notice of intent (NOI) was published in the Federal Register on February 22, 2008. The legal notice announcing the beginning of the 45-day comment period was also published on February 22, 2008. Scoping letters were sent out on March 10, 2008 to interested parties (permittees, federal, state, county, and local government agencies, tribal agencies, political figures, and other persons who have expressed an interest in natural resource management on the Nebraska National Forests and Grasslands). The project was put on hold in 2008 to accommodate the Nebraska and South Dakota black-tailed prairie dog management NEPA analysis and decision. The project was re-initiated in October 2009. A second NOI and legal notice were published on June 11, 2010, updating the process for the proposed project. Another scoping letter was mailed to interested parties on June 11, 2010. A total of forty-five comment letter were received for both comment periods.

Using the comments from the public, other agencies, and permittees submitted during both scoping comment periods, the interdisciplinary team developed a list of issues which were refined into key issues and non-key issues. The key issues led the agency to develop two alternatives to the proposed action:

- ♦ Alternative 1 – No Action, No Livestock Grazing
- ♦ Alternative 2 – No Change, Current Livestock Grazing Management

The proposed and preferred action is to use adaptive management to implement best management grazing practices and to monitor to ensure there are no disparities between current conditions in the project area and the 2001 *Land and Resource Management Plan, Nebraska National Forest and Associated Units* (LRMP) desired conditions for the project area. This final environmental impact statement (FEIS) describes current environmental conditions and analyzes environmental consequences of the proposed action and alternatives.



# CHAPTER 1

## PURPOSE OF AND NEED FOR ACTION

### Changes Between Draft and Final\_\_\_\_\_

Location in document	Change
Summary	Updated information about the initial notice of intent
Public Involvement section	Added information about comments received on the draft environmental impact statement (DEIS).

### Background\_\_\_\_\_

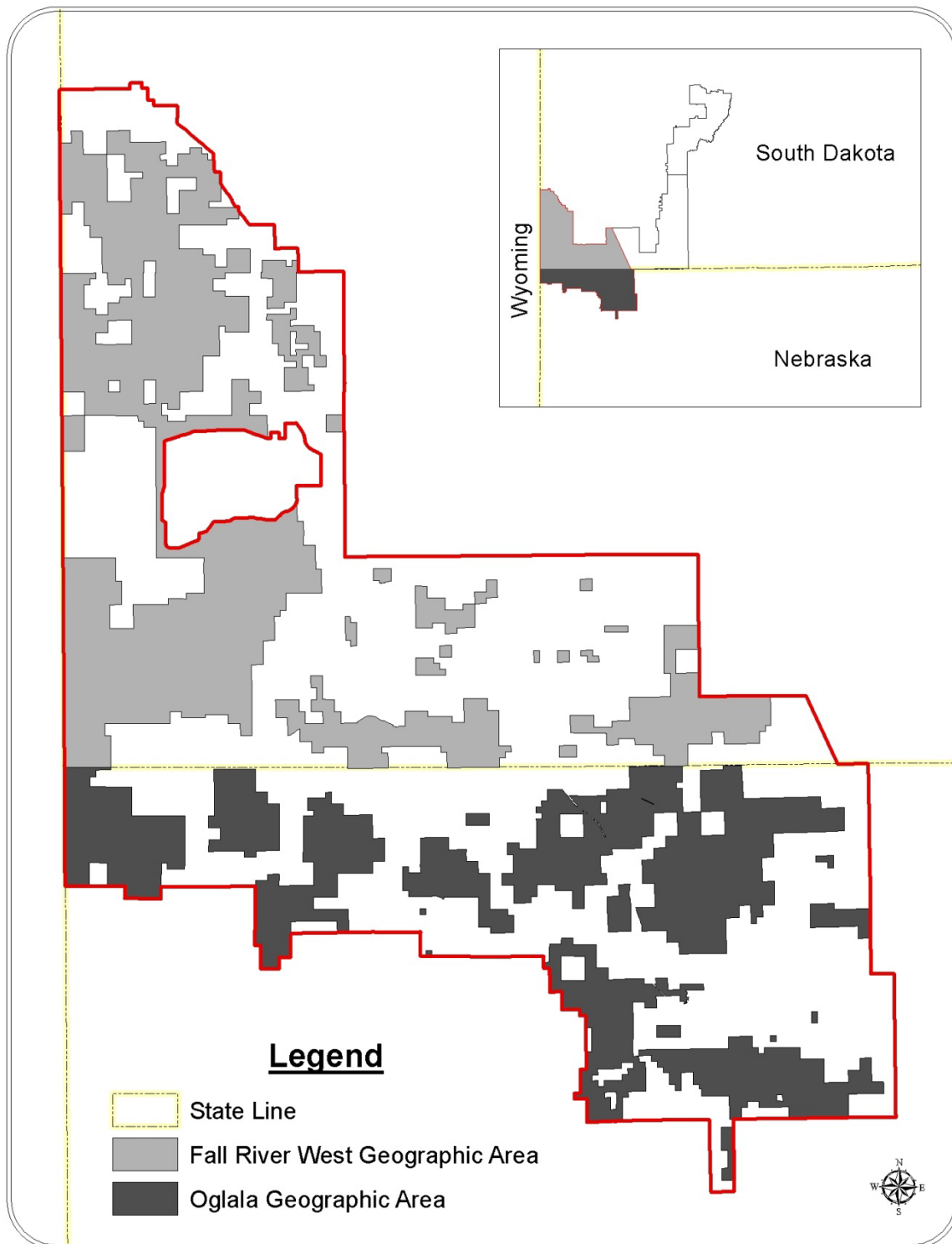
The Pine Ridge and Fall River Ranger Districts have prepared this final environmental impact statement (FEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. Supporting documentation, including more detailed analyses of project area resources, is on file in the project record at the Nebraska National Forests and Grasslands (NNFG) supervisor's office in Chadron, Nebraska.

This FEIS is not a decision document. It discloses the direct, indirect, and cumulative environmental impacts of implementing the proposed action and alternatives to that action. The Forest Service decisions will be stated and explained in two separate records of decision (RODs), one for each geographic area.

The FEIS focuses on national forest system (NFS) lands administered by the Pine Ridge and Fall River Ranger Districts. It evaluates livestock grazing on the part of the NNFG encompassed by the Oglala and Fall River West geographic areas (GAs) (see figure 1). It does not evaluate livestock grazing activities on other allotments, other ranger districts, or other national forests. It does evaluate cumulative actions associated with livestock grazing effects on both the NFS lands and, to the degree feasible, on the adjacent or associated private lands.

The Pine Ridge Ranger District in Chadron, Nebraska administers the Oglala GA. The Fall River Ranger District in Hot Springs, South Dakota administers the Fall River West GA.

**Figure 1-1. Project vicinity map.**



Livestock grazing is one of many activities that occur on the two ranger districts. Livestock grazing permits are typically issued for a ten-year period on specific portions of the project area. The project area consists of 76 active cattle grazing allotments: 41 in the Fall River West GA and 35 in the Oglala GA. Currently, there is a maximum of 59,946 animal unit months (AUMs) of livestock grazing permitted in the project area. Allotments in the project area cover 94,174 acres in the Oglala GA and 117,548 acres in the Fall River West GA. The Fox allotment is not included in this project; it was analyzed in 2004 as part of the Fall River Southeast GA livestock grazing management decision. Maps of the allotments in the two GAs are in appendix C.

Management on each allotment is implemented through issuance of the grazing permits, grazing agreements, and the associated allotment-specific allotment management plans (AMPs) based on the alternative selected in the NEPA decision. The AMP is the implementation document by which the Forest Service communicates to the permittee and others the management objectives and planned actions to accomplish those objectives. The allotments currently under permit in the analysis area are operating under AMPs developed ten to twenty-six years ago and are being proposed for revision. This project-level NEPA analysis and decision, and the associated AMPs, will guide permitted livestock grazing management and associated activities within the project area until there is a need to revisit the NEPA process. AMP development and approval and issuance of grazing permits to reflect the selected alternative will not be subject to further NEPA documentation.

## Purpose and Need

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The purpose of this project is to determine if livestock grazing will continue to be authorized on all, none, or portions of the seventy-six allotments in the Oglala and Fall River West GAs, and if livestock grazing is to continue, how to best maintain or achieve desired conditions and meet forest plan objectives (see appendix A for a list of forest plan objectives addressed under this proposal).

The action is needed to ensure that the project areas are meeting forest plan desired conditions for plant species composition; vegetation structure; and habitat for endangered, threatened, proposed, and candidate species; Region 2 sensitive species; and management indicator species. There is also a need to review existing livestock management strategies and, if necessary, update them to implement direction in the 2001 *Land and Resource Management Plan for the Nebraska National Forest and Associated Units* (LRMP) and meet the requirements of section 504 of Public Law 104-19 (Rescissions Act, signed 7/27/95).

The difference between existing and desired conditions in the project area creates the need for action. At the geographic area scale, there is little difference between existing and desired conditions on the Oglala and Fall River West GAs, particularly for vegetation structure and seral stage (see following tables). However in individual allotments, some resources in some areas are not meeting or moving toward desired conditions or management efficiency could be improved. For these areas, adaptive management (e.g., reducing stocking rate, changing livestock grazing rotations, installing new water sources) provides the flexibility to improve efficiency and address discrepancies between existing and desired conditions at the pasture/allotment scale.

**Table 1-1. Oglala GA desired and current condition for seral stage.**

	Seral Stage			
	Late	Late Intermediate	Early Intermediate	Early
LRMP objective	10 to 30%	50 to 70%	10 to 20%	1 to 10%
Current condition	28%	47%	24%	1%

**Table 1-2. Oglala GA desired and current condition for structure.**

	High	Medium	Low
LRMP objective	10 to 30%	50 to 70%	10 to 30%
Current condition	20%	56%	24%

**Table 1-3. Fall River West GA desired and current condition for seral stage.**

	Late	Late Intermediate	Early Intermediate	Early
LRMP objective	10 to 30%	50 to 70%	10 to 20%	1 to 10%
Current condition	15%	64%	17%	4%

**Table 1-4. Fall River West GA desired and current condition for structure.**

	High	Medium	Low
LRMP objective	10 to 30%	50 to 70%	10 to 30%
Current condition	12%	62%	26%

The LRMP states that livestock grazing may occur as one of the multiple uses on the NNFG, consistent with standards and guidelines. Livestock grazing is currently occurring in the analysis area under the direction of existing AMPs and through direction provided in annual operating instructions (AOIs). The results of this analysis may require issuing or modifying term grazing permits and AMPs.

## Proposed Action

The Pine Ridge and Fall River ranger districts propose continuing to permit livestock grazing on seventy-six allotments in the Oglala and Fall River West GAs using an adaptive management process which will help meet LRMP direction and meet or move toward desired conditions identified in the LRMP and the project-level NEPA analysis and decision. Chapter 2 includes a more detailed description of the proposed action and the need for action by allotment and pasture. Appendix B contains allotment maps showing the existing improvements under alternative 2 and the proposed improvements under alternative 3.

## Decision Framework

The Pine Ridge and Fall River district rangers are the responsible officials for this proposal. The decisions to be made for this proposal are as follows:

- ♦ Will livestock grazing continue to be authorized on all, none, or a portion, of the seventy-six allotments in the Oglala and Fall River West geographic areas?
- ♦ What grazing system and management practices may be implemented?
- ♦ What range improvements are needed to implement the decision?
- ♦ What type and frequency of monitoring will be conducted, and how will that monitoring be used to provide feedback to adjust management?

## Public Involvement

**Scoping:** The project was initially identified in the quarterly schedule of proposed actions (SOPA) for the Nebraska National Forests and Grasslands starting in 2007. The notice of intent (NOI) was published in the Federal Register on February 22, 2008. The legal notice announcing the beginning of the 45-day comment period was also published on February 22, 2008. Scoping letters were sent out on March 10, 2008 to interested parties (permittees, federal, state, county, and local government agencies, tribal agencies, political figures, and other persons who have expressed an interest in natural resource management on the Nebraska National Forests and Grasslands). The project was put on hold in 2008 to accommodate the Nebraska and South Dakota black-tailed prairie dog management NEPA analysis and decision. The project was re-initiated in October 2009. A second NOI and legal notice were published on June 11, 2010, updating the process for the proposed project. Another scoping letter was mailed to interested parties on June 11, 2010. A total of forty-five comment letter were received for both comment periods.

Using the comments from the public, other agencies, and permittees, the interdisciplinary team (IDT) grouped them into themes and separated them into one of the following three categories:

1. Key issues that drove alternative development.
2. Non-key issues which will be tracked and effects disclosed.
3. Issues that are beyond the scope of this analysis.

The IDT identified preliminary issues prior to the formal public scoping. Comments received after the scoping efforts revealed other social and environmental issues related to the proposed action. The key issues are listed below. The DEIS contains the complete list of issues identified during scoping.

- ♦ Issue 8. There is a concern that the proposed range improvements include increased stockwater (dirt tanks and/or pipelines) to more effectively utilize the outlying areas, and temporary and permanent electric fence to control/plan grazing patterns.
- ♦ Issue 10. There is concern that the management plans include flexible grazing systems and stocking rates to allow adjustment for things like drought.
- ♦ Issue 30. There is concern that the proposed livestock grazing management includes rest/rotation.

**Comments on the draft environmental impact statement (DEIS):** The DEIS was released for public review and comment in on July 20, 2012 when the notice of availability was published in the Federal Register. The comment period closed on September 4, 2012. The forest received comments from five individuals, agencies, and organizations. Comments were separated into themes by resource topics and assigned to the appropriate specialist or specialists for initial review and response. Final responses to the comments were reviewed and edited by the ID team and the responsible official. The final EIS chapters and appendices were modified in response to some comments. Comments and responses are displayed in appendix E.

## Other Related Efforts

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**Travel management and recreational use:** The Forest Service manages for multiple uses including recreational activities. The *2010 Travel Management Plan for the Nebraska National Forest, Buffalo Gap National Grassland, Oglala National Grassland, and Samuel R. McKelvie National Forest EIS* is currently being implemented and describes recreational use.

**Noxious weeds** in the project area are managed under two previous decisions: 1993 forestwide *EA Management of Undesirable Plant Species* for the Oglala GA and 1999 *Integrated Weed Management EA* for the Fall River West GA.

**Land exchanges:** There are two land exchanges in the project area: Sand Creek and Cain Creek. The Sand Creek land exchange is nearing completion as of September 2013. When the exchange is completed, 760 acres will transfer from federal to private ownership: pasture 42 and part of pasture 38E in the Sand Creek allotment. The allotment is currently under permit to the Sugarloaf Grazing Association. Eight hundred acres will transfer from private to federal ownership; 40 acres will become part of the Horn allotment and continue to be under permit to the Sugarloaf Grazing Association and 760 acres will be permitted to the Sugarloaf Grazing Association and managed as a one allotment-one pasture forage reserve.<sup>1</sup>

The Cain Creek land exchange is in the preliminary stages and could involve the exchange of approximately 2,265 acres on the Fall River Ranger District in Fall River County to private ownership while acquiring an estimated 2,930 acres in Pennington County on the Wall Ranger District. Approximately 1,226 acres are located in the project area in nine pastures on the following four allotments: Warbonnett, Stearns, DeGering, and Miller. Four of the nine pastures are managed as woody draw pastures. The Fall River West GA would lose 394 acres of woody draws and 839 acres of uplands.

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<sup>1</sup> A forage reserve will provide livestock grazing forage to area permittees and livestock operators when their normal grazing units are unavailable because of, but not limited to, any of the following reasons: non-use rest periods prior to and following a prescribed fire, non-use rest periods following a wildfire, to allow resource recovery on other area grazing units, in times of drought to assist area livestock operators and lessen the resource impacts of grazing. It may also be grazed to maintain desired vegetation conditions on the forage reserve.

# **Chapter 2**

## **Alternatives, Including the Proposed Action**

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Introduction

Alternatives Analyzed in Detail

No Action/No Livestock Grazing

No Change/Current Livestock Grazing  
Management

Proposed Action/Livestock Grazing  
with Adaptive Management

Design Features

Monitoring

Alternatives Considered but Eliminated

Comparison of Alternatives

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## CHAPTER 2

### ALTERNATIVES, INCLUDING THE PROPOSED ACTION

#### Changes Between Draft and Final

Location in document	Change
Alternative 1 discussion, first paragraph	Added the requirement for considering this alternative in response to a comment.
Alternative 2 discussion, first paragraph	Added discussion explaining the difference between authorized and permitted use/AUMs.
Table 2-1. Current management	Removed enclosure from Brush Creek allotment discussion. This is a correction in response to comments.
	Made minor corrections/clarifications to the AUMs and current grazing management for some allotments
	Added column displaying permitted AUMs.
	Added a definition for forage reserve.
Table 2.2. Fall River proposed actions	Updated the AUMs and current management for some allotments.
Table 2.3. Potential adaptive management	Added sagebrush seeding/planting.
Table 2 4. Oglala GA proposed actions	Added clarification to the table title regarding proposed AUMs.
	Corrected Indian Brush 9A and 9B discussion in response to comments.
	Corrected discussion on the aspen enclosure in the Roundtop allotment.
Table 2 5. Fall River West GA proposed actions	Added sagebrush planting to the proposed action as a future adaptive management option in the following allotments/pastures: Beebe-Markey (North), Benton (West Dry Creek), Cottonwood Group (Childers), Ellison Dam (North, Soper, South), Fossil Point, Porter (Sheaman), Tubbs (School).
	Updated proposed management for some allotments
Design features table	Added two design features for fencing in response to comments.
	Added a design feature for drought management to the range vegetation and livestock grazing management section.
	Added a design feature to protect hydric soils in response to comments.

## Alternatives Considered in Detail

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The Forest Service fully developed three alternatives, the “no action” alternative and two “action” alternatives (one being the proposed action), in response to issues raised. The effects of all three alternatives relative to issues and resources are addressed in chapter 3 of this document. Table 2-7 provides a comparison of effects and allotment-specific actions between the three alternatives.

### Alternative 1 – No Action/No Livestock Grazing

The Council for Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) requires that a no action alternative be developed as a benchmark from which the agency can evaluate the proposed action. No action in livestock management planning is synonymous with “no domestic livestock grazing” and means that domestic livestock grazing would not be authorized within the project area (FSH 2209.13; WO amendment 2209.13-2005-10).

Under this alternative, domestic livestock grazing would be discontinued on all 76 allotments in the Oglala and Fall River West GAs. As provided in FSH 2209.13 Section 16.6, all term grazing permits and grazing agreements would be terminated two grazing seasons after the record of decision is signed (36CFR222.4(a)(1)), and no livestock grazing would be authorized after that date. Private lands included in these allotments could continue to be grazed at the landowner’s discretion; however, the landowner would be required to keep the livestock off the national forest/grasslands.

All existing rangeland structural improvements would remain in place but would not be regularly maintained. Periodic inspection of improvements would be done to determine whether removal or maintenance is needed. Removal would be authorized by a separate administrative decision.

### Alternative 2 – No Change/Current Livestock Grazing Management

For the Oglala GA, livestock grazing would continue on all allotments as currently authorized. For the Fall River West GA, permitted livestock grazing would continue on all allotments as is currently prescribed in existing allotment management plans.

In both GAs, no adaptive management practices would be used. All existing rangeland structural improvements would remain in place and would be maintained. Structural improvements approved in the existing allotment management plans would continue to be built.

Detailed information about allotment conditions can be found in the project record and may be viewed at the Nebraska National Forests and Grasslands supervisor’s office in Chadron, NE.

In the following current management table for the Oglala GA, permitted AUMs refer to the AUMs prescribed in existing allotment management plans (many of which are dated 1987). The permitted numbers are provided to give historical context. The 15-year authorized AUMs and season refer to the numbers and season of use established in the annual operating instructions (AOI) for approximately 15 years of normal precipitation and forage growth. The authorized AUMs have been the basis for monitoring for the past 15 years.

**Table 2-1. Current management (alternative 2) for Oglala GA allotments and pastures.**

Allotment Pastures	Permitted AUMs	Authorized AUMs	Season	Current Grazing Management
Antelope Creek Pastures 12, 12A, 18	1,025	787	5/15 – 10/15	Pastures 12 (cross-fenced into north and south) and 12A (cross-fenced into north and south) used in fall or early spring. Pasture 18 is used in summer.
Ardmore Pastures 25A-C	785	785	5/15 – 9/30	Three-pasture deferred rotation
Badlands Pasture 35	1,425 (all pastures)	1,241 (all pastures)	5/15 – 10/15	Three-pasture rotation with Roundtop pastures 34E, 34W, and 36
Pastures 33A through D and 37			5/15 – 10/15	Five-pasture deferred rotation
Benedict Buttes Pastures 39E and 39W	945	945	5/15 – 10/15	Two-pasture rotation
Boardgate Pastures 22N, 30N, 30S	1,465	1,465	5/20 – 10/15	Three-pasture deferred rotation
Pasture 30A	35	46	10/1 – 2/28	Single pasture used for grazing period in conjunction with private land.
Burlington Pastures 23, 23N, 23N Riparian	700	700	5/15 – 10/15	Pasture 23N Riparian always grazed in early spring or late fall. Pastures 23N and 23S grazed in a two-pasture alternating rotation.
Eagle Eye Pasture 36A	33	33	5/15 – 11/30	Single pasture use for the grazing period with private land.
Grandma Davis Draw Pastures 3N and 3S	790	790	6/1 – 9/15	Two-pasture rotation
Hat Creek Pastures 17E, 17N, 17S, 17W	264	200	11/10 – 2/15	Dormant season, four-pasture deferred rotation
Horn Pastures 40E, 40W, 40W Riparian, 41	1,190	1,030	5/15 – 10/15	Pasture 40W riparian grazed first. Pastures 40W, 40E and 41 grazed in a three-pasture deferred rotation.
Horse Creek Pastures 6N and 6S	537	537	6/15 – 12/15	Two-pasture alternating rotation.
Horsehead Pastures 28N and 28S	1,635	1,201	5/15 – 10/8	Two-pasture alternating rotation.
Indian-Brush Creek Oglala GA Pastures 1A, 1N, 1S, 5, 4, 9A, 9B, 10 Fall River West GA Pastures 2E, 2W, 3N, 3S, BC	4,164	4,164	Variable season of use between May 1 and Oct. 31.	Thirteen-pasture, high-intensity, short-duration rotation.

Allotment Pastures	Permitted AUMs	Authorized AUMs	Season	Current Grazing Management
Indian Draws Pasture 13	492	588	6/1 – 10/1	Single pasture used for the grazing period.
Long Branch Pastures 21A through 21E	975 (all pastures)	975 (all pastures)	5/15 – 10/31	See individual pastures below
Pasture 21A				Grazed as single pasture with a varied season.
Pastures 21B through 21E				Grazed in a rotation with pasture 21B grazed first. Pastures 21C and D grazed in two-pasture alternating rotation. Pasture 21E is grazed last.
Lower Whitehead Pasture 32A	115	115	5/15 – 10/25	Single pasture grazed season-long with private land.
Meng Reservoir Pastures 24N and 24S	395	395	5/15 – 9/5	Two-pasture alternating rotation.
Montrose Pasture 16A and 16B	595	550	5/15 – 10/30	Pasture 16A grazed first for two weeks, then pasture 16B during the early summer, then pasture 16A in late summer and fall.
Pete Smith Hill Pastures 22N, 22S, and 43	820	820	5/25 – 10/1	Three-pasture deferred rotation with 22N grazed always in the middle.
Prairie Dog Pasture 45	480	480	NA	Single pasture not grazed except lightly in dormant season 2008-2011 for research purposes. Used as a forage reserve. <sup>1</sup>
Roundtop Pastures 34E, 34W, and 36	745 (all pastures)	594	5/15 – 10/5	Three-pasture deferred rotation.
Pasture 34A		26	7/1 – 8/1	Single pasture use for the grazing period.
Sand Creek Pastures 38, 38E, 38E Riparian, and 42	920	920	5/15 – 10/31	Pasture 38E Riparian grazed first or last. Pastures 38, 38E, and 42 grazed in a three-pasture, deferred rotation.
Sherrill Hills Pastures 2A, 2B, and 3A	575	520	6/15 – 9/20	Three-pasture rotation.
Short Branch Pasture 26	240	469	NA	Used as a forage reserve.

<sup>1</sup> A forage reserve will provide livestock grazing forage to area permittees and livestock operators when their normal grazing units are unavailable because of, but not limited to, any of the following reasons: non-use rest periods prior to and following a prescribed fire, non-use rest periods following a wildfire, to allow resource recovery on other area grazing units, in times of drought to assist area livestock operators and lessen the resource impacts of grazing. It may also be grazed to maintain desired vegetation conditions on the forage reserve.

Allotment Pastures	Permitted AUMs	Authorized AUMs	Season	Current Grazing Management
Sixteen Mile Corner Pasture 46	29	79	5/15 – 9/30	Single-pasture use for the grazing period.
Squaw Ridge Pastures 11N and 11S	420	420	5/15 – 10/15	Two-pasture alternating rotation
Strawstack Butte Pasture 48	46	45	6/1 – 11/1	Single pasture use for the grazing period in conjunction with private leased land.
Sugarloaf Pastures 31E, 31W, and 31W Riparian	1,245	1,168	5/15 – 9/30	Pasture 31W riparian grazed first. Pastures 31E and 31W grazed in a two-pasture, alternating rotation.
Toadstool Pastures 30B, 38W, and 44 Pasture 30C	839	839	5/15 – 9/30	Three-pasture deferred rotation
			5/15 – 8/15	Single pasture use for the grazing period in conjunction with private land.
Upper Whitehead Pasture 32	310	310	6/10 – 9/25	Single pasture use for the grazing period in conjunction with leased school land.
Walden Hills Pastures 27, 27N, 27S	925	925	5/15 – 10/15	27 and 27S grazed in an alternating rotation. Pasture 27N grazed with leased school pasture that is not part of the allotment.
Warbonnet Pasture 8  Pasture 8A  Pastures 14 and 15N Pasture 15 Riparian	1,170 (all pastures)	1,165 (all pastures)	5/15 – 6/15 9/20 – 10/4	Grazed first and last in the same year with authorized livestock from Sherrill Hills allotment.
			5/15 – 6/15 9/20 – 10/4	Grazed first and last in the same year with pastures 14 and 15N.
			6/15 – 9/20	Two-pasture alternating rotation.
			10/5 – 11/20	Grazed last, including authorized livestock from Sherrill Hills allotment.
Whitehead Pasture 19 and 19A	395	395	5/20 – 10/5	Two-pasture alternating rotation
Wolf Butte Pasture 29  Pasture 29A	824 (all pastures)	826 (all pastures)	7/16 – 10/14 or 5/15 – 8/15	Single pasture use for grazing period. Grazing period alternates each year.
			7/16 – 9/15 or 5/15 – 7/15	Single pasture use for the grazing period in conjunction with private land. Grazing period alternates each year.
York Pasture 7	300	438	5/15 – 9/15	Single pasture use for the grazing period.

**Table 2-2. Current management (alternative 2) for Fall River West GA allotments.**

Allotment	Permitted AUMs	Permitted Season	Current Grazing Management
Antelope	2,312	5/15 – 10/15 2/1 – 12/30	Five-pasture rotation, one bull pasture, two pastures used variably.
Beebe-Markey	928	3/15 – 4/30 9/26 – 11/1 12/1 – 2/28	One pasture winter use, one deferred pasture used when range ready.
Benton	NA	NA	Grazed as part of Porter allotment
Indian-Brush Creek – see previous table			
Cottonwood Group	1,003	5/1 – 11/15	Two season-long pastures, one early spring pasture.
Cottonwood Misc.	NA	NA	These three small parcels of federal land are not currently managed within any allotment.
Cow Camp	727	6/1 – 12/23	Five-pasture deferred rotation.
Crowe Dam	NA	NA	Vacant allotment currently being used as a wildlife exclosure. A vacant allotment is one that does not have assigned grazing use under a permit; however, it is grazed when monitoring indicates grazing is needed to achieve management objectives.
Danks	2,099	5/1 – 12/13	Seven-pasture rotation with four pastures grazed the same time each season and three rotated, two-fall/winter pastures.
DeGering	40	10/1 – 12/20 4/15 – 4/30	One fall/winter pasture. In the Fall River West GA, administered by the Pine Ridge Ranger District.
East Association	1,916	5/1 – 10/30	Two-pasture deferred rotation.
East Porter	995	5/1 – 10/15 11/26 – 5/14	Five-pasture rotation, one winter pasture
Eberle	516	5/1 – 5/15 6/12 – 10/31	Two pastures; one grazed early to utilize crested wheatgrass, one grazed mid-summer to fall.
Ellison Dam	1,220	5/16 – 11/15	Three-pasture deferred rotation.
Fossil Point	32	11/1 – 1/9	One winter pasture.
Fuchs	175	6/1 – 7/31	One season-long pasture.
Furrow	597	6/1 – 11/12	Five-pasture rotation with Trotter allotment.
Henry	1,093	5/10 – 8/30	Five-pasture rotation, two-pasture deferred rotation.
Honadel	480	6/1 – 10/24	Four pastures, each grazed by different herds at different times of year.
Hudson	118	11/1 – 12/6	One season-long pasture.
Indian Misc.	NA	NA	These five small parcels are not currently managed within any allotment.

Allotment	Permitted AUMs	Permitted Season	Current Grazing Management
Miller 387	403	5/16 – 10/15 11/1 – 3/31	Two-pasture deferred rotation, three pastures mixed with private land and grazed variably.
Miller 514	207	6/1 – 10/15	One season-long pasture, one winter pasture.
Moody	478	5/16 – 10/15	Two-pasture deferred rotation.
Morris	94	10/2 – 11/3	One winter pasture.
Mule Creek	595	6/15 – 9/9	Two-pasture rotation.
Pfister	1,400	6/1 – 10/15	High intensity, low duration, variable dates
Plumb	276	6/3 – 11/17	Two-pasture deferred rotation.
Plumb-Henry	1,001	6/1 – 10/20	Two season-long pastures.
Porter	833	1/1 – 12/31	Two winter pastures, one spring/fall pasture, two pastures worked into private land rotation.
Roller	320	5/16 – 10/5	Two pastures used same season each year.
Ross	539	5/10 – 10/3	Two pastures used in rotations with other allotments.
Simons	311	5/15 – 12/31	Two-pasture deferred rotation.
Soske	333	5/16 – 11/15	One season-long pasture.
Stearns	413	5/22 – 10/30	Four-pasture rotation.
Trotter	294	11/1 – 12/15	Two pastures used in rotation with Furrow allotment.
Trotter-Coal Creek	1,637	5/10 – 9/25	Three-pasture rotation.
Tubbs	802	5/16 – 11/15 11/1 – 4/30	Four-pasture rotation; one fall pasture, one winter pasture.
Van Loan	490	5/11 – 10/16	Two-pasture rotation.
Warbonnet	128	6/10 – 8/13	Three pastures mixed with 86% private land, used variably.
Wasserburger	251	6/1 – 10/1	Two pastures used same season each year.
West Association	1,238	5/15 – 10/15	Two-pasture deferred rotation.
West Porter	882	5/15 – 11/30	Three-pasture rotation.

## Alternative 3 – Proposed Action/Livestock Grazing with Adaptive Management

Under the proposed action, livestock grazing would continue on the Oglala and Fall River West GAs using adaptive management. The Pine Ridge and Fall River ranger districts are proposing changes to resolve disparities between current conditions and site-specific desired conditions for individual allotments or to improve management efficiency. In addition, the two ranger districts would implement additional adaptive management options and monitoring to resolve any ongoing disparities. Most existing rangeland structural improvements that are being used would remain in place and would be maintained; however, a few existing fences would be removed under this alternative. Improvements that have met their life expectancy would be replaced or removed. Proposed range structural improvements that would be implemented under this project now and those being proposed under adaptive management can be seen in tables 2-4 and 2-5 and in the maps in appendix B.

In adaptive management, decisions are made as part of an ongoing process. Adaptive management involves planning, implementing, monitoring, evaluating, and incorporating new knowledge into management based on scientific findings and the needs of society. Results are used to modify future management methods.

Under the proposed action, selected practices would be implemented on a site-specific basis where monitoring indicates a need for a management changes. Monitoring would be done to see if the management practices are accomplishing the site-specific objectives set forth in the FEIS. If monitoring indicates the initial management practices are not maintaining or moving resource conditions toward desired conditions, other adaptive management options would be implemented. The adaptive management strategies listed in the following table can be implemented singly or in combination to best meet or move toward the desired conditions.

Adaptive options must be covered by NEPA analysis and disclosure. If these options are adequately discussed in the project level FEIS and ROD, they may then be implemented as needed without further NEPA. Options that are not evaluated and disclosed in this FEIS or the RODs would likely need further review to determine if additional NEPA is warranted. In particular, this would apply to any ground-disturbing actions listed in the following table.

**Table 2-3. Potential adaptive management actions available for all allotments in the Oglala and Fall River West GAs.**

Adjust stocking rate to light, moderate, or heavy grazing intensity to meet seral stage objectives (see LRMP appendix I).
Implement riparian grazing dates – no livestock use from 6/15 – 9/20
Implement alternative riparian grazing dates based upon specific conditions (topography, range rider, upland water sources, livestock use patterns)
Incorporate a range rider to move livestock from riparian areas (herding)
Change season of use and/or livestock utilization days – do not exceed permitted AUMs (stocking rate)
Change animal numbers – do not exceed permitted AUMs (stocking rate)
Change animal class – do not exceed permitted AUMs (stocking rate)
Delay livestock turn-on date
Rest from livestock grazing



Do not allow livestock grazing
Construct fence to create riparian unit – allow grazing under riparian grazing dates
Construct fence to exclude livestock from areas of concern (riparian, wooded draws, springs, wetlands, etc.)
Construct standard barbed wire fence and/or temporary or permanent electric fence to control livestock distribution patterns
Control livestock distribution patterns using water (turn water on or off at developed water sites)
Control livestock distribution patterns by constructing cross fences
Construct livestock water development (pipeline, tanks, windmill, well, stock dam, submersible pump, solar)
Remove or relocate existing developments (fence, pipeline, tanks, windmill, well, stock dam)
Implement a rotational grazing system (e.g., multi-pasture deferred, rest-rotation, multiple unit rotation with permittees private land, high-intensity/short duration)
Rehabilitate areas seeded to introduced grass species back to native grass, shrub and forb species
Use of salt or supplement to draw livestock toward or away from specific areas
Early spring grazing may be allowed, when necessary, to meet management objectives
Seed or plant sagebrush for restoration purposes (this applies to allotments on the Fall River West GA)

In the following table, permitted AUMs for each allotment would be the same as the 15-year authorized AUMs as shown in table 2-1. This level of grazing has been accepted as reasonable for many years and would be the ongoing basis for permitted AUMs.

Annual fluctuations in timing and amounts of precipitation and/or changes in vegetative condition may result in annual changes of authorized numbers and/or seasons of use. For the grazing association, which manages a large, diverse geographic area, additional flexibility is allowed to provide more management choices. Annual increases in authorized AUMs would be allowed when justified by conditions or management objectives. The increases would not exceed approximately 10% of permitted AUMs. For example, when forage production is predicted to be 10% or higher than the average, AUMs may be increased up to approximately 10% over permitted AUMs that year to take advantage of increased forage production. If higher numbers are needed to achieve management objectives (for example, vegetation structure or removal of undesirable plant species), AUMs could be increased up to the same level.

The AUMs permitted under the grazing agreement would exceed the total AUMs for individual allotments by approximately 10%. Based on the allotments currently under the grazing agreement, permitted AUMs would be 25,000. If AUMs change for any reason – for example, pastures or allotments are added or removed – the AUMs permitted under the grazing agreement would also change.

### ***Pasture-specific Proposed Actions***

**Table 2-4. Oglala GA proposed actions to be implemented immediately and adaptive management actions that may be implemented in the future. This table only displays allotments or pastures where management would change.**

<b>Allotment (Pasture)</b>	<b>Proposed Actions to be Implemented Now</b>	<b>Future Adaptive Options</b>	<b>What the Actions Will Accomplish</b>
Antelope Creek (12)	Build temporary electric fence (1 mile) to divide the pasture into north and south areas and keep the cattle in the northern riparian area for shorter times. Graze the northern part 5/15 to 6/15 or after 10/1. Graze the southern part in a deferred 5-pasture rotation with northern part of 12A and all three parts of 18.	Change season of use to early spring or late fall. Decrease livestock numbers using the riparian area. Rest the riparian area.	Riparian plants would recover from grazing impacts. Desirable woody plants and submergent and emergent vegetation would increase.
Antelope Creek (12A)	Build temporary electric fence (0.75 mile) to divide the pasture into north and south areas and keep cattle in the southern riparian area for shorter times. Build water lot around tank so that it will serve both sub-pastures (0.25 mile). Graze the southern part 5/15 to 6/15 or after 10/1. Graze the northern part in a deferred 5-pasture rotation with southern part of 12 and all three parts of 18.	Change season of use to early spring or late fall. Decrease livestock numbers using the riparian area. Rest the riparian area.	Continue the upward trend of the riparian area.
Antelope Creek (18)	Divide pasture into three pastures with permanent electric fence (3.5 miles); install water lot around existing tank (0.25 mile); and install new tank along existing pipeline. Graze in a 5-pasture deferred rotation with the northern part of 12A and the southern part of 12.	Reduce livestock numbers. Reduce livestock grazing intensity or duration.	Reduce uneven utilization. Plants would recover from grazing impacts. New water source would provide additional water for wildlife.
Ardmore (25A)	Develop new water source (tank and pipeline) in northeast corner. Repair driving surface of dam.	Change livestock class to yearlings. Increase livestock grazing intensity.	Reduce uneven utilization. In overused areas, plants would recover from grazing impacts.
Ardmore (25B)	Reduce livestock grazing duration. Repair driving surface of dam.	Reduce livestock numbers. Rest the pasture for several years or every other year until conditions improve.	Improve the downward trend. Plants would recover from grazing impacts.

<b>Allotment (Pasture)</b>	<b>Proposed Actions to be Implemented Now</b>	<b>Future Adaptive Options</b>	<b>What the Actions Will Accomplish</b>
Ardmore (25C)	Repair washed out north dam.	None identified.	Improve water storage capability and availability.
Badlands (33A and 33D)	Increase size of two water lots between these two pastures.	Develop new water source.	Improve water availability.
Badlands (33B)	Repair cistern in northeast corner.	None identified.	Improve water storage capability and availability.
Badlands (37)	Move and replace fiberglass tank currently in northwest corner of 37 with an 11-foot tire tank. Also requires pipeline from well in pasture 36 to the new site.	Divide the pasture by building temporary or permanent fence. Reduce livestock numbers. Change livestock class to yearlings.	Attract cattle to underutilized parts of the pasture. Plants along Sand Creek Road would recover from grazing impacts. New water source would provide additional water for wildlife.
Benedict Buttes (39E)	Repair faces of two WPA dams	None identified	Prevent dam failure.
Benedict Buttes (39W)	Graze in the spring two out of every three years.	None identified	Reduce the impact on rare plant communities in 39E that spring grazing could cause.
Boardgate (30N)	Repair dam in northeast.	Develop new water source (tank) on eastern side of pasture along existing pipeline.	Improve water storage capability and availability. Continue upward trend. New water source would provide additional water for wildlife.
Burlington (23S)	Reduce livestock grazing duration.	Change season of use to utilize cheatgrass in the spring only for a few years.	Continue upward trend. Reduce cheatgrass and bare ground. More desirable plants would gradually repopulate the area.
Burlington (23S) Burlington (23N) Burlington (23N Riparian)	Alternate grazing Burlington 23N Riparian first in the spring and last in the fall.	See above for 23S	Continue upward trend. In overused areas, plants would recover from grazing impacts. One pasture in this 3-pasture rotation would be rested every year.
Eagle Eye (36A)	Graze with private land, alternating each year between early and late grazing.	None identified	Improve or sustain current vegetation conditions. This pasture would be rested every other year.

<b>Allotment (Pasture)</b>	<b>Proposed Actions to be Implemented Now</b>	<b>Future Adaptive Options</b>	<b>What the Actions Will Accomplish</b>
Hat Creek (17N)	Cut down banks of Whitehead Creek.	None identified	Allow livestock access to the east side of pasture, allowing west side to recover from grazing impacts.
Horn (40W)	Develop water source (tank and pipeline) in the northwest corner.	Build temporary or permanent fence. Reduce livestock numbers. Change season of use to winter/dormant season grazing. Rest pasture.	In overused areas, plants would recover from grazing impacts.
Horn (41)	Change season of use to spring for several years or for the majority of years in a rotation. Graze Rock Bass Reservoir enclosure occasionally.	Increase livestock grazing intensity during the spring. Non-grazing solution, such as prescribed fire.	Reduce invasive grasses, prickly pear cactus, and sweetclover. Reduce decadent vegetation.
Horn (40W) Horn (40E) Horn (40W Riparian) Horn (41)	Flexible schedule depending on presence of sweet clover. Generally, a 4-pasture deferred rotation. Alternate each year grazing 40W Riparian first in the spring and last in the fall.	See above for Horn (40W) and Horn (41).	See above for Horn (40W) and Horn (41). One pasture would be rested every year. Allow rest for rare plant community in 40W Riparian.
Horsehead (28N)	Change season of use if necessary to avoid problem plants.	Rest the pasture.	Avoid grazing plants that cause photosensitivity in livestock.
The Indian-Brush Creek allotment includes pastures in both the Oglala and Fall River West GAs.			
Indian-Brush Creek (all pastures)	See below for individual pasture proposed actions. No changes needed for pastures 1N, 1S, 1A, 4, 5, 9A, and 10.	Adjust season of use if the overall allotment rotation plan is modified.	Improve or sustain upland rangeland vegetation condition.
Indian-Brush Creek (1N)	None identified	Adjust grazing season to late fall when necessary to further enhance riparian area and protect any possible rare plant community.	Continued hardwood seedling establishment and sustained hardwood regeneration.
Indian-Brush Creek (9B)	Install pipeline from existing pipeline to existing tank to provide water to 9B	None identified. See above for all pastures.	Sustain upland rangeland vegetation condition and improve reliability of water.
Indian-Brush Creek (3N)	Install pipeline from existing pipeline to new tank.	None identified. See above for all pastures.	Sustain upland rangeland vegetation condition and improve water availability.
Indian-Brush Creek (3N, 3S)	Replace existing electric division fence with permanent barb-wire fence	None identified. See above for all pastures.	Improve or sustain upland rangeland vegetation condition.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Indian-Brush Creek (2W and 2E)	Remove electric fence and combine pastures 2E and 2W.	None identified. See above for all pastures.	Improve or sustain upland rangeland vegetation condition.
Indian-Brush Creek (2E)	Adjust season of use Install pipeline from existing pipeline to new tank	None identified. See above for all pastures.	Sustain upland rangeland vegetation condition and improve water availability.
Indian-Brush Creek (BC)	Reduce days used, change season of use	None identified. See above for all pastures.	Improve upland rangeland vegetation condition.
Indian Draws (13)	None	Cross fence this allotment into two pastures.	Reduce downward trend in Antelope 18.
Long Branch (21A)	Alternate between early and late grazing.	None identified	Maintain upward vegetation trend. Pasture would be rested every other year.
Long Branch (21B)	Increase livestock numbers in the early spring. This pasture also has a riparian area that can be utilized at the same early spring period.	Increase livestock grazing intensity.	Improve utilization of crested wheatgrass without harming the riparian area.
Long Branch (21C)	Reduce livestock numbers. Reduce livestock grazing duration.	Change season of use to winter/dormant season grazing. Rest the pasture.	Improve forb diversity and reduce annual brome grasses and broom snakeweed.
Long Branch (21E)	Encourage livestock to graze outside of riparian area using salt/mineral.	Build temporary or permanent fence.	Riparian plants would recover from grazing impacts. Desirable woody plants and submergent and emergent vegetation would increase.
Lower Whitehead (32A)	If the private landowner were to build a permanent fence between the Forest Service and private lands, this allotment could be a two-pasture rotation. Then, if the permittee wishes, add another private pasture to make this a 3-pasture rotation. If necessary to improve cattle distribution, develop additional water source (impoundment) in the north side.	Reduce livestock numbers. Reduce livestock grazing intensity or duration.	Reduce uneven utilization. In overused areas, plants would recover from grazing impacts. The riparian area on the private pasture would improve because cattle would rotate into one or two other pastures for part of the year.
Meng Reservoir (24N)	Repair dam	NA	Prevent dam failure.

<b>Allotment (Pasture)</b>	<b>Proposed Actions to be Implemented Now</b>	<b>Future Adaptive Options</b>	<b>What the Actions Will Accomplish</b>
Meng Reservoir (24S)	Change season of use to spring for several years or for the majority of years in a rotation.	Increase livestock grazing intensity.	Improve utilization of crested wheatgrass and sweetclover and improve downward trend. In overused areas, plants would recover from grazing impacts.
Montrose (16A)	Develop water source (tank) at the south end along the road using existing pipeline.	Change season of use to spring on years with heavy sweetclover. Increase livestock grazing intensity.	Improve utilization of sweetclover and vegetation in the southern end. New water source would provide additional water for wildlife.
Montrose (16B)	Repair spillways in double dams. Construct new dam in southeast corner.	None identified.	Prevent dam failure. Improve water availability.
Pete Smith Hill (43)	Encourage livestock grazing in the west and north using water and salt/mineral.	Increase livestock grazing intensity. Build temporary or permanent fence.	Improve utilization of smooth brome and crested wheatgrass in the north and improve utilization of the west. Reduce overutilization in the center of the pasture and allow plants to recover from grazing impacts.
Pete Smith Hill (22N, 22S, 43)	3-pasture deferred rotation with 22N always in the middle. Graze 43 first more often.	See above for 43.	See above for 43. One pasture would be rested every year.
Roundtop (34A)	Alternate between early and late grazing.	None identified.	Continue upward vegetation trend. Pasture would be rested every other year.
Roundtop (34E and 34W)	Based on monitoring of plant recovery after the 2012 fire, increase livestock grazing duration in 34W and decrease livestock grazing duration in 34E. Encourage grazing in northwest side of 34W using salt/mineral and water.	Reduce livestock numbers. Rest pasture 34E. Change livestock class to yearlings. Remove fence between these pastures.	Improved utilization. Need to monitor 34W for effects of higher stocking rate on possible rare plant communities.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Roundtop (36)	Change season of use to spring for several years or for the majority of years in a rotation. In the Quaking Aspen Stand SIA, remove old stock tank, remove all interior fences, remove and reroute the old south fence, install new south fence line on the ridge and tie into the private fence.	Increase livestock grazing intensity.	Increase utilization of crested wheatgrass and sweetclover.  Protect springs and riparian area, which are habitat for rare and sensitive species.
Sand Creek (38E and 38E Riparian)	Alternate each year grazing 38E Riparian first in the spring and last in the fall in the 3-pasture rotation with 38 and 38E. Add electric fence to form a water lot along the fence line between 38E and 38E Riparian around an existing tank.	None identified. Build temporary or permanent fence to separate the north from south sides of 38E Riparian.	Improve utilization of north side of 38E Riparian.
Sand Creek (42)	Change season of use to before June 15 for several years or for the majority of years in a rotation.	Build temporary or permanent fence to keep cattle out of the riparian area.	Plant recovery from the 2012 fire. Riparian plants would recover from grazing impacts. Desirable woody plants and submergent and emergent vegetation would increase.
Sherrill Hills (2A)	Repair face of WPA dam on the east side.	None identified.	Prevent dam failure.
Sherrill Hills (2A, 2B, 3A)	5-pasture deferred rotation with Warbonnet pastures 8 and 8A. Change season of use to spring for several years in each rotation.	Increase livestock grazing intensity in the spring.	Reduce the annual brome grasses and improve forb diversity. One pasture in this rotation would be rested every year.
Short Branch (26)	Remove the fence with Waldon Hills 27N so there will be a water point in the southeast corner of this pasture.		Improve cattle distribution in underutilized areas of the pasture.
16 Mile Corner (46)	Change season of use to spring for several years or for the majority of years in a rotation.	Rest the pasture every other year.	Improve the vegetation dominated by annual brome grasses, prickly pear cactus, and weedy forbs.
Squaw Ridge (11N, and 11S)	If permittee wishes, add private pasture to create a 3-pasture rotation.	Reduce livestock numbers. Reduce livestock grazing intensity or duration.	Improve the downward trend in range condition. In overused areas, plants would recover from grazing impacts. One pasture would be rested every year.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Sugarloaf (31E, 31W, and 31W Riparian)	Alternate each year grazing 31W Riparian first in the spring and last in the fall. Graze 31E and 31W in the spring once every four years.	None identified.	Reduce the impact on rare plant communities in 31E that spring grazing could cause.
Toadstool (30B)	Repair dam in center of pasture.	None identified.	Prevent dam failure.
Toadstool (38W)	Change season of use to spring for the majority of years in a rotation.	Increase livestock grazing intensity.	Improve utilization of crested wheatgrass and sweetclover and improve downward trend. In overused areas, plants would recover from grazing impacts.
Upper Whitehead (32)	If the permittee were to build a temporary or permanent east-to-west fence across the Forest Service and school-leased lands (1.5 miles), this allotment could be a two-pasture rotation. Use a portable autogate across the county road. Then, if the permittee wishes, add another private pasture to make this a 3-pasture rotation.	Increase livestock grazing intensity. Change livestock class to yearlings.	Improve utilization. In overused areas, plants would recover from grazing impacts. One pasture would be rested every year.
Waldon Hills (27 and 27S)	Increase livestock grazing duration.	Change season of use to spring for several years.	Improve utilization, reduce decadence, and reduce annual brome grasses. One pasture would be rested every year.
Waldon Hills (27N)	Remove the fence with Short Hills 26 so this pasture will be part of 26 (0.5 mile).	None identified.	Make this pasture more useful.
Warbonnet (8 and 8A)	5-pasture deferred rotation with Sherrill Hills 2A, 2B, 3A. Change season of use so these pastures are not grazed early and late every year. Repair face of WPA dam on the southwest side of 8A.	Reduce livestock numbers. Reduce livestock grazing intensity or duration.	Increase cool-season grasses. Prevent dam failure. Two pastures in this 5-pasture rotation would be rested every year.



Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Warbonnet (14, 15, 15N, 15 Riparian)	3-pasture deferred rotation with pasture 15 Riparian alternating between first in the spring and last in the fall. Rebuild big dam on west side of pasture 15 Riparian. For pasture 15 Riparian, change season of use to spring before June 15 for some of the years in a rotation.	Reduce livestock numbers. Reduce livestock grazing intensity or duration.	Improve the condition of the Antelope Creek riparian area. Riparian plants would recover from grazing impacts. Desirable woody plants and submergent and emergent vegetation would increase. Prevent dam failure and improve water availability. Allow rest for rare plant community in pasture 15.
Whitehead (19)	Move fence to previously abandoned fenceline and remove old fence.	NA	Reduce fence failure during high runoff on Whitehead Creek.
Whitehead (19A)	Add a second overflow tank.		Provide reliable livestock water.
York (7)	Cross-fence this single pasture to institute a rotation system (1.5 miles). Install a new tank in the southwest corner along the pipeline. If permittee wishes, include adjacent private land into a 3-pasture rotation.	Increase livestock grazing intensity or duration.	Improve utilization. Reduce cheatgrass and bare ground New water source would provide additional water for wildlife.

**Table 2-5. Fall River West GA proposed actions to be implemented immediately and adaptive management actions that may be implemented in the future. Shaded rows indicate allotments with proposed AUM reductions. This table only displays allotments or pastures where management would change.**

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Antelope (4-Sections)	Increase stocking through rotation Install new pipeline and tanks	Prescribed fire	Achieve low structure. Improve distribution.
Antelope (East)	Increase stocking through rotation. Bury existing pipeline.	Prescribed fire	Achieve low structure. Improve distribution.
Antelope (Middle)	Fence the Wallace Ranch Special Interest Area (SIA)	None identified	Protect and maintain the integrity of the paleontological site.
Antelope (Johnson)	Install new pipelines and tanks	See below	Improve livestock distribution and provide additional water for wildlife.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Antelope (Johnson, Middle, Sherwin, South, West)	Reduce stocking through rotation. Stock one pasture annually at <70%.	Further reduce stocking. Change season of use. Change management system.	Achieve high structure at least once every 5 years. Improve vegetation condition and reverse downward trend within 10 years.
Beebe-Markey (North)	Reduce permitted stocking rate from 928 AUMs to 711 AUMs	Further reduce stocking. Change management systems. Sagebrush planting from seed or seedlings	Reverse downward trend of upland rangeland vegetation. Increase structure for sage grouse habitat.
Benton (All pastures)	Combine with Porter allotment.	None identified.	Increase management efficiency.
Benton (West Dry Creek)	Reduce permitted stocking.	Further reduce stocking. Change season of use. Change management system. Sagebrush planting from seed or seedlings	Improve vegetation conditions. Increase structure for sage grouse habitat.
Cottonwood Group (Childers)	Reduce stocking through rotation.	Further reduce stocking. Change season of use. Change management system. Sagebrush planting from seed or seedlings	Improve vegetation condition. Increase structure for sage grouse habitat.
Cottonwood Group (West)	Increase stocking through rotation. Construct new dam.	Prescribed fire	Achieve low structure. Improve livestock distribution.
Cottonwood Misc (All)	Assign to Cottonwood Grazing Association in the Ellison Dam allotment and modify grazing agreement to reflect additional AUMs.	None identified.	Improve administration of the allotment.
Cow Camp (299)	Create ground disturbance with livestock grazing. (Pasture is not being grazed currently.)	Prescribed fire.	Promote hardwood regeneration and establish cottonwood seedbed.
Cow Camp (Cow Camp)	Encourage livestock to graze outside of riparian area using salt/mineral.  No grazing between June 15 <sup>th</sup> and November 1 <sup>st</sup> for hardwood draw management. Install new pipeline and tank.	Further reduce stocking. Change season of use. Change management system.	Achieve high structure at least once every 5 years. Improve condition of riparian area. Upward trend of hardwood species. Provide additional water source.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Cow Camp (Cow Camp, Northeast, Northwest, Southeast, and Southwest)	Stock one pasture annually at <70%.	Further reduce stocking. Change season of use. Change management system.	Achieve high structure at least once every 5 years.
Cow Camp (Southeast and Southwest)	Relocate and build fence between southeast and southwest pastures.	See above	Increase management options.
Crowe Dam	Repair dam. Graze periodically when monitoring indicates grazing is needed to achieve management objectives (currently this is a vacant allotment).	Prescribed fire	Prevent dam failure. Ensure dam continues to provide wildlife habitat. Improve grassland conditions and reverse downward trend.
Danks (all pastures)	Reduce permitted stocking rate from 2,099 AUMs to 1,913 AUMs.	Further reduce stocking. Change season of use	Improve vegetation condition. Manage for moderate structure.
Danks (Fiddle Creek and Grabb)	Allow early season grazing. Install new pipeline and tank.	None identified.	Improve livestock distribution. Improve vegetation condition. Improve utilization of crested wheatgrass. Increase water availability.
East Porter (All)	Combine with Miller 514 allotment.	None identified.	Increase management efficiency.
East Porter (NW)	Install new pipeline and tanks. Bury existing pipeline.	None identified.	Improve livestock distribution. Increase water availability.
East Porter (Winter)	Increase stocking through rotation.	None identified.	Manage for low structure.
Eberle (Fiddle Creek)	Decrease stocking through rotation. Install new pipeline and tanks.	Further reduce stocking. Change season of use.	Improve livestock distribution. Improve vegetation condition. Increase water availability.
Eberle (Wheatgrass North and South)	Increase stocking through rotation. Combine pastures. Install new pipeline and tanks	None identified.	Manage for low structure. Improve livestock distribution and provide additional water source for wildlife.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Ellison Dam (North, Soper, and South)	Reduce permitted stocking rate from 1,220 AUMs to 1,098 AUMs.	Further reduce stocking. Change season of use. Change management system. Sagebrush planting from seed or seedlings	Improve vegetation conditions. Increase structure for grouse habitat.
Fossil Point	No grazing between June 15 <sup>th</sup> and November 1 <sup>st</sup> for hardwood draw.	Discontinue grazing. Sagebrush planting from seed or seedlings	Increase management efficiency. Improve vegetation conditions. Increase structure for grouse habitat.
Fuchs (North)	Install new pipeline and tanks.	None identified.	Increase water availability.
Fuchs (Creek pasture)	Construct new dams Modify Cottonwood Grazing Association permit to reflect added pasture. No grazing between June 15 <sup>th</sup> and November 1 <sup>st</sup> for hardwood draw.	None identified.	Increase water availability. Create an upward trend for hardwood species.
Furrow (East, Middle, West)	Stock one pasture annually at <70%. Combine with Trotter allotment.	Further reduce stocking. Change season of use. Change management system.	Achieve high structure in at least one pasture every year. Increase management efficiency.
Henry (Hay Creek)	Install new pipeline and tanks Increase stocking through rotation	Increase grazing intensity to achieve low/moderate structure	Improved swift fox habitat Possible downward trend in vegetation condition
Henry (Hollow Creek)	Install new pipeline and tanks	Improve livestock distribution	Additional water source for wildlife
Henry (Northeast)	Increase stocking through rotation.	None identified.	Achieve low/moderate structure. Improve swift fox habitat.
Henry (Oscar)	Combine with School Section pasture (Mule Creek allotment).	None identified.	Increase management efficiency.
Honadel (East, Northeast)	Combine pastures.	None identified.	Increase management efficiency.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Honadel (Middle and Starner)	Stock <100% through rotation. Install new pipeline and tanks.	Further reduce stocking. Change season of use. Change management system.	Increase structure. Improve vegetation conditions. Maintain health of chokecherry patches (Starner). Improve livestock distribution.
Hudson (North)	Allow early season grazing. Reduce permitted stocking rate from 118 AUMs to 83.	None identified.	Improve utilization of crested wheatgrass. Improve vegetation condition.
The Indian-Brush Creek allotment includes pastures in both the Oglala and Fall River West GAs. It is administered by the Pine Ridge Ranger District.			
Indian-Brush Creek (all pastures)	See below for individual pasture proposed actions. No changes needed for pastures 1N, 1S, 1A, 4, 5, 9A, and 10.	Adjust season of use if the overall allotment rotation plan is modified.	Improve or sustain upland rangeland vegetation condition.
Indian-Brush Creek (1N)	None identified	Adjust grazing season to late fall when necessary to further enhance riparian area and protect any possible rare plant community.	Continued hardwood seedling establishment and sustained hardwood regeneration.
Indian-Brush Creek (9B)	Install pipeline from existing pipeline to existing tank to provide water to 9B	None identified. See above for all pastures	Sustain upland rangeland vegetation condition and improve reliability of water.
Indian-Brush Creek (3N)	Install pipeline from existing pipeline to new tank.	None identified. See above for all pastures.	Sustain upland rangeland vegetation condition and improve water availability.
Indian-Brush Creek (3N, 3S)	Replace existing electric division fence with permanent barb-wire fence.	None identified. See above for all pastures.	Improve or sustain upland rangeland vegetation condition.
Indian-Brush Creek (2W and 2E)	Remove electric fence and combine pastures 2E and 2W.	None identified. See above for all pastures.	Improve or sustain upland rangeland vegetation condition.
Indian-Brush Creek (2E)	Adjust season of use Install pipeline from existing pipeline to new tank	None identified. See above for all pastures	Sustain upland rangeland vegetation condition and improve water availability.
Indian-Brush Creek (BC)	Reduce days used, change season of use	None identified. See above for all pastures.	Improve upland rangeland vegetation condition.
Indian Misc (453 and 454)	Assign to Indian-Brush Creek allotment.	None identified.	Increase management efficiency.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Indian Misc (Extra)	Assign to Antelope allotment.	None identified.	Increase management efficiency.
Indian Misc (NGA 1)	Assign to Cow Camp allotment.	None identified.	Increase management efficiency.
Indian Misc (Skinny)	Assign to Wasserburger allotment.	None identified.	Increase management efficiency.
Miller 387 (North and South)	Install new tanks. Bury existing pipeline.	None identified.	Improve livestock distribution.
Miller 387 (North)	Increase stocking through rotation. Bury existing pipeline.	None identified.	Achieve low/moderate structure. Improve swift fox habitat.
Miller 514 (All)	Install new pipeline and tanks. Combine with East Porter allotment. Reduce permitted AUMs from 207 AUMs to 200 AUMs.	None identified.	Improve livestock distribution. Improve vegetation conditions. Increase management efficiency.
Moody	Install new pipeline and tanks.	None identified.	Increase water availability.
Morris (All)	Build permanent fence across south end of T11S, R3E, NW1/4, NW1/4. No grazing in south pasture, monitor and re-evaluate. Temporarily adjust AUMs.	Further reduce stocking.	Improve vegetation condition and increase structure.
Mule Creek (North)	Install new pipeline and tanks Increase stocking through rotation	Improve livestock distribution Increase grazing intensity to achieve low/moderate structure	Additional water source for wildlife. Improved swift fox habitat. Possible downward trend in vegetation condition.
Mule Creek (School Section)	Install new pipeline and tanks Reassign to Henry Allotment	Improve livestock distribution More efficient management	Additional water source for wildlife.
Pfister (Perimeter)	Allow early season grazing.	Increase stocking.	Improve utilization of crested wheatgrass. Improve vegetation condition.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Plumb-Henry (All)	Reduce permitted AUMs to 80% of suggested NRCS stocking rate (from 1,000 AUMs to 800 AUMs). Install new pipeline and tanks.	Further reduce stocking. Change season of use. Change management system.	Improve vegetation condition and increase structure. Improve livestock distribution and provide additional water for wildlife.
Porter (All pastures)	Combine with Benton allotment. Reduce permitted AUMs from 833 to 798.	None identified. Sagebrush planting from seed or seedlings	Increase management efficiency. Improve vegetation condition. Increase structure for sage grouse habitat on Sheaman pasture.
Roller (All)	Install new pipeline and tanks.	None identified.	Improve livestock distribution. Increase water availability.
Roller (East)	Repair Roller Dam.	None identified.	Prevent dam failure.
Ross	Rebuild temporary fence between North and South pastures into permanent structure. Install new pipeline and tanks.	None identified.	Increase management efficiency. Improve livestock distribution and provide additional water for wildlife.
Simons (All)	Reduce permitted stocking rate from 311 AUMs to 290 AUMs.	Further reduce stocking. Change season of use. Change management system.	Increase structure. Improve vegetation conditions.
Stearns (All)	Reduce permitted stocking rate for the allotment from 413 AUMs to 379 AUMs.	See pasture-specific options below.	See pasture-specific information below.
Stearns (Bailey)	Continue upland rangeland monitoring to determine effects of current stocking rate.	Adjust stocking rate (AUMs) based upon rangeland monitoring results.	Increase structure to discourage prairie dog expansion. Improve vegetation condition.
Stearns (North)	Reduce permitted AUMs. Install new pipeline and tanks.	Further reduce stocking. Change season of use. Change management system.	Increase structure. Improve vegetation condition. Increase water availability.
Stearns (Kane)	Reduce permitted AUMs.	Further reduce stocking. Change season of use Change management system.	Increase structure. Improve vegetation condition.

Allotment (Pasture)	Proposed Actions to be Implemented Now	Future Adaptive Options	What the Actions Will Accomplish
Trotter (All)	Install new pipeline and tanks. Combine with Furrow allotment	None identified.	Improve livestock distribution. Increase water availability.
Trotter/Coal Creek (West)	Remove pasture from rotation.	None identified.	Comply with closure order due to undetonated ordnance.
Trotter/Coal Creek (East and South)	Install Igloo water pipeline through allotment on way to Indian Grazing Association.	None identified.	Increase water availability.
Trotter/Coal Creek (Coal Creek, East and South)	Stock one pasture annually at <70%.	Further reduce stocking. Change season of use. Change management system.	Achieve high structure at least once every 3 years in each pasture.
Tubbs (Carrol)	Increase stocking through rotation.	None identified.	Achieve low structure.
Tubbs (East Dry Creek, Fritz)	Decrease stocking through rotation.	Further reduce stocking. Change season of use. Change management system.	Improve vegetation condition. Increase structure.
Tubbs (School)	Decrease stocking through rotation.	Further reduce stocking. Change season of use. Change management system. Sagebrush planting from seed or seedlings	Improve vegetation condition. Increase structure for sage grouse habitat.
Van Loan	Install new pipeline and tanks.	None identified.	Increase water availability.
West Porter (Middle)	Increase stocking through rotation. Allow early season grazing. Install new pipeline and tank.	None identified.	Improve utilization of crested wheatgrass Improve livestock distribution. Improve vegetation condition. Increase water availability.
West Porter (North, Safety Zone)	Install new pipeline and tanks.	None identified.	Improve livestock distribution and provide additional water for wildlife.
West Porter (mostly private)	Fence out private land.	None identified.	Increase management efficiency.



## Design Features

**Table 2-6. Design features to reduce or eliminate impacts from the proposed actions.**

<b>Botany</b>	
1.	During the allotment management plan (AMP) process or as other opportunities arise, design and implement livestock grazing strategies to provide well-developed emergent vegetation through the growing season on 30% to 50% of the wetlands (natural and constructed) distributed across watersheds and landscapes, contingent on local site potential (forest plan fish, wildlife and rare plants guideline 10).
2.	During the AMP process or as other opportunities arise, design and implement livestock grazing strategies to provide for thick and brushy understories and multi-layer and multi-age structure in riparian habitats, wooded draws and woody thickets, contingent on local site potential (forest plan fish, wildlife and rare plants guideline 11).
3.	As opportunities arise, design timing, intensity and frequency of mowing, burning and livestock grazing to maintain and/or increase populations of sensitive plant species and the health of rare plant communities (forest plan fish, wildlife and rare plants standard 27).
<b>Cultural resources</b>	
4.	If significant cultural resources are being impacted by grazing or range maintenance activities, fence off the site to protect the cultural resource, or fully excavate the site in order to recover important cultural resource information. Note: All mitigation measures for cultural resources will require consultation with the Nebraska and South Dakota State Historic Preservation Officers, Indian Tribes, and other interested parties.
5.	Develop and implement a heritage inventory strategy and implementation schedule to survey and evaluate sites, in support of management actions and activities as agreed upon with the state historic preservation offices (SHPO), tribal historic preservation offices (THPO) and to include compliance with laws Sec. 106 and Sec. 110 of the National Historic Preservation Act (forest plan goal 2b, objective 1).
<b>Paleontology resources</b>	
6.	Protect key paleontological resources classes 3, 4, and 5 of the fossil potential classification from disturbance, or mitigate the effects of disturbance, to conserve scientific, interpretive, and legacy values. (See [forest plan] appendix J for details). (forest plan paleontological resources standard 1)
7.	Survey and post federal land boundaries where paleontological sites have Fossil Potential Classification sensitivity rankings of 3, 4 or 5. (See [forest plan] appendix J for details). (forest plan paleontological resources guideline 2)
8.	Prior to ground-disturbing activities, conduct paleontologic surveys in any area where there is a high potential to encounter these resources according to the process outlined in [forest plan] Appendix J. (forest plan paleontological resources standard 2)
9.	Fence out the Wallace Ranch Paleontological Special Interest Area (SIA) and portions of the Toadstool Geological Park SIA.
<b>Hydrology and soil resources</b>	
10.	Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff (forest plan water standard 1).
11.	Manage land treatments to maintain enough organic ground cover in each land unit to prevent harmful increased runoff (exceptions shall occur in special habitat situations (e.g. prairie dog habitat). (forest plan water standard 2)
12.	Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health. (forest plan water standard 5)

13.	Manage water-use facilities to prevent gully erosion of slopes to prevent sediment and bank damage to streams. (forest plan water standard 8)
14.	Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands. (forest plan water standard 9)
15.	Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem including quantity and quality of water. (forest plan water standard 13)
16.	<p>Locate facilities away from the water's edge or outside the riparian areas, woody draws, wetlands and floodplains unless alternatives have been assessed and determined to be more environmentally damaging. If necessary to locate facilities in these areas, then:</p> <ul style="list-style-type: none"> <li>• Deposit no waste material (silt, sand, gravel, soil, slash, debris, chemical or other material) below high water lines, in riparian areas, in the areas immediately adjacent to riparian areas or in natural drainageways (draws, land surface depressions or other areas where overland flow concentrates and flows directly into streams or lakes).</li> <li>• Prohibit deposition of soil material in natural drainageways.</li> <li>• Locate the lower edge of disturbed or deposited soil banks outside the active floodplain.</li> <li>• Prohibit stockpiling of topsoil or any other disturbed soil in the active floodplain.</li> </ul> <p>(Forest plan water guideline 14)</p>
17.	Fence the three small areas with hydric soils in the Cottonwood Group, Simons, and Fuchs allotments to protect them from livestock grazing impacts (Fall River West GA only).
<b>Range vegetation and livestock grazing management</b>	
18.	<p>Maintain or improve the resource by managing for the health of key species through grazing impacts. The following annual indicators should result in meeting or moving towards desired conditions. Utilization may be measured both within season and after the grazing season depending on various factors such as timing and amount of precipitation or allotment conditions.</p> <ul style="list-style-type: none"> <li>• Utilization of key species will generally not exceed 50%. If needed to obtain objectives, the maximum utilization may be set lower than 50%.</li> <li>• Timing and intensity will ensure an opportunity for key species on key areas to reach near full growth, or to re-grow to near full-growth, by the end of the grazing or growing season, whichever occurs later.</li> <li>• If used, the Grazing Response Index (GRI), on a pasture basis, will generally have a neutral or positive rating. A negative rating may result in livestock management changes the following grazing season.</li> </ul>
19.	If supporting evidence from Forest Service monitoring and analysis clearly demonstrates that an increase in permitted stocking can be sustained, the Forest Service will determine an appropriate number and season-of-use that represents a sustainable carrying capacity of the allotment, and will adjust permitted use accordingly, not to exceed 20% on an annual basis (follow the grants process outlined in the Grazing Permit Administration Handbook (FSH 2209.13)).
20.	Adjust livestock management activities annually as needed to take into account the effect of natural processes, such as droughts, fires, floods, and grasshoppers on forage availability. (forest plan livestock grazing guideline 3)
21.	Drought management practices would be implemented, as needed, according to recommendations found in <i>Drought Management on Range and Pastureland, A Handbook for Nebraska and South Dakota</i> , (Reece et al. 1991). For a detailed example, refer to appendix F of the FEIS.

<b>22.</b>	Manage livestock grazing to maintain or improve riparian/woody draw areas. Implement the following practices: Avoid season-long grazing and activities, such as feeding, salting, herding, or water developments, which concentrate livestock in riparian/woody draw areas. Control the timing, duration, and intensity of grazing in riparian areas to promote establishment and development of woody species. (forest plan livestock grazing guideline 4)
<b>23.</b>	Meet rest objectives based on, but not limited to, the following desired conditions: Where high structure is required for plant and animal communities and/or reproductive success of MIS and threatened, endangered, and sensitive species. Where rest is required for vegetation recovery after wildfire or prescribed burns. Where ungrazed areas are desired for biological diversity. (forest plan livestock grazing guideline 5)
<b>24.</b>	When allotment management plans are revised, adjust stocking levels to account for the variations in liveweight of livestock if needed to meet desired vegetation conditions. (forest plan livestock grazing guideline 6)
<b>25.</b>	Prioritize and remove any fences or water developments that are not contributing to achieving desired conditions. (forest plan livestock grazing guideline 9)
<b>26.</b>	Build new and reconstructed fences to provide for big game movement (LRMP Appendix B – see below) and access for recreation, fire protection, and mineral development. (Infrastructure use and management guideline 6).

<b>Kind of Livestock<sup>2</sup></b>	<b>Big Game Species</b>	<b>Number of Wires</b>	<b>Maximum Height (in)</b>	<b>Wire Spacing (from ground up)</b>	<b>Wire Type<sup>3,4</sup></b>
Cattle only	Deer, Elk, Pronghorn	3	38	16, 10, 12	Bottom smooth
Cattle and Sheep	Deer, Elk, Pronghorn	4	40	16, 6, 6, 12	Bottom smooth
Sheep only	Deer, Elk, Pronghorn	4	32	12, 6, 6, 8	Bottom smooth
Cattle only	Bighorn Sheep	3	39	20, 15, 4	Barbed

These recommendations are designed for facilitating movement of both young and adult big game animals during all seasons including winter and spring when snow drifting can be expected.

<sup>2</sup> No standards are available for bison, but provisions for big game movement should be considered when building bison fences.

<sup>3</sup> Woven (net) wire fences are not recommended.

<sup>4</sup> One or more of the top wires may also be electrified.

<b>27.</b>	As opportunities allow, install gates along all existing fences at intervals to provide reasonable access. (Infrastructure use and management guideline 7)
<b>28.</b>	Install all gates so they are easily opened and closed by all users. (Infrastructure use and management guideline 8)
<b>Wildlife</b>	
<b>29.</b>	Modify livestock grazing practices as needed to reduce adverse impacts of drought on food and cover for prairie grouse and other wildlife (fish, wildlife, rare plants standard 2).
<b>30.</b>	When installing new livestock water tanks, install durable and effective escape ramps for birds and small mammals. During maintenance of existing tanks, replace ramps that are ineffective or missing (fish, wildlife, rare plants standard 3).

31.	To help reduce disturbances to breeding and nesting sharp-tailed grouse, do not authorize the following activities within 1.0 mile of active display grounds from March 1 to June 15: construction (e.g., roads, water impoundments, pipelines, utilities, oil and gas facilities, fencing). (Fish, wildlife, rare plants guideline 15)
32.	During the AMP process or as other opportunities arise, design and implement livestock grazing strategies that provide quality nesting and brooding habitat on at least 25% of the grasslands (consistent with vegetation objectives for the geographic area) within 1.0 mile of active sharp-tailed grouse display grounds. Consult [forest plan] Appendix H for a description of quality habitat for sharp-tailed grouse (Fish, wildlife, rare plants guideline 17).
33.	Design vegetation and pest management activities (e.g., prescribed burning, mowing, livestock grazing, or grasshopper spraying) and pesticide application projects in known habitats of sensitive butterfly species to reduce mortality of butterflies and to maintain or enhance nectar and larvae host plant species (Fish, wildlife, rare plants guideline 30).
34.	To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 0.25 miles of their dens from March 1 to August 31: construction (e.g., roads, water impoundments, oil and gas facilities). (Fish, wildlife, rare plants guideline 45)
35.	To reduce disturbances to swift fox during the breeding and whelping seasons, do not authorize the following activities within 0.25 miles of their dens from March 1 to August 31: construction (e.g., pipelines, utilities, fencing). (Fish, wildlife, rare plants guideline 46)
36.	During the AMP process or as other opportunities arise, design and implement livestock grazing strategies that provide a mosaic of low, moderate and high grassland structure in occupied swift fox habitat, consistent with vegetation objectives for the geographic area (Fish, wildlife, rare plants guideline 48)

## Monitoring

Monitoring and evaluation are key elements in adaptive management, allowing us to measure whether we are effective in meeting or moving toward our desired conditions within the appropriate timeframes and allowing us to make adaptive changes to management as indicated by evaluating the results of monitoring.

This project includes two types of monitoring: implementation (short-term) and effectiveness (long-term). Implementation monitoring will measure whether or not proposed actions and design criteria are being implemented as planned. Effectiveness monitoring will evaluate how effective management actions are at moving toward or achieving desired conditions. Implementation and effectiveness monitoring for this project are listed in table 2-6. Other monitoring protocols listed in the *R2 Rangeland Analysis and Management Training Guide* (RAMTG) or other agency handbooks or guides may be used in the future as we learn more in the adaptive process and as our information needs change. The amount of monitoring done annually will depend on funding and availability of resources.

Current management under this alternative should be sufficient to address water quality issues. Until total maximum daily loads (TMDLs) are determined by the states of South Dakota and Nebraska, there is no way of knowing if management might be affecting impairment. At this time, we will rely on the states' monitoring of the waterways.

**Table 2-7. Monitoring to be conducted under alternative 3.**

Monitoring Item	Frequency	Method	Objectives
<b>Implementation (Short-term) Monitoring</b>			
Permit and AOI compliance (on/off dates, improvement maintenance, etc.)	Annually or more/less frequently.		Verify that permittees are complying with the term grazing permit.
Allotment resource inspections	Annually or more/less frequently. Allotments will be monitored based on resource concerns	Grazing response index (GRI) Utilization Ocular Paired plot Robel pole	Determine annual grazing pressure and effects of repetitive defoliation during the growing season.  Assess current year grazing management and help develop a grazing plan for the next year.
Range readiness	Annually or more/less frequently. Allotments will be monitored based on resource concerns.	Visual inspection of vegetation stages of key species	Ensure there is enough forage when livestock go on the allotment.
Sage grouse leks and nesting	Every 1 - 3 years	Lek surveys Droop height	Ensure rangeland health and grouse habitat are meeting or moving toward desired conditions.
<b>Effectiveness (Long-term) Monitoring</b>			
Rangeland vegetation	Approximately every 5 years on representative range sites in the GA	NRCS range analysis Similarity index	Determine if rangeland vegetation is meeting, moving toward, or not meeting or moving toward desired conditions
Woody draw and riparian areas	Approximately every 5 years on representative areas in the GA.	Stream bank impact Proper functioning condition (streams) Great Plains riverine scorecard Ecological rating scorecard-Uresk	Ensure that riparian areas and woody draws are meeting or moving toward desired conditions.  Ensure streams are meeting or moving toward proper functioning condition (PFC)
Sensitive plants Rare plant communities Species of concern	Approximately every 10 years	Population monitoring Photo points	Ensure populations are increasing or maintaining to meet desired conditions
Key botanical areas	Approximately every 10 years	Ocular plant composition	Ensure populations are increasing or maintaining to meet desired conditions

## Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the DEIS provided no suggestions for alternative methods for achieving the purpose and need. Therefore, no other alternatives were considered, nor were any dismissed from detailed consideration.

## Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative.

**Table 2-8. Effects summary by alternative for the entire project area and for the Fall River West and Oglala GAs separately.**

	<b>Alternative 1 No Action/No Grazing</b>	<b>Alternative 2 No Change/Current Management</b>	<b>Proposed Action Grazing with Adaptive Management</b>
<b>Entire Project Area</b>			
Recreation	Potential increase in some recreation opportunities in the short-term due to vegetation/habitat improvement and lack of livestock. Possible reduction in dispersed camping and horseback riding due to increase in tall vegetation. No change in recreation opportunity spectrum (ROS) or scenic integrity objectives (SIOs).	Where vegetation structure and diversity are in a downward trend, recreation opportunities would decrease or change focus. No change in existing ROS or SIOs.	Impacts to recreation opportunities would be the same as in alternative 2. Construction of dams and tank installation would move small, localized areas to a more modified ROS class. ROS for each GA would remain unchanged. Fence construction would negatively affect two high SIO areas but protect fossil resources. Fence construction would negatively affect a moderate SIO area but would protect sensitive soils. Tank installation could negatively affect a high SIO area but they are being placed behind a hill out of sight of U.S. Highway 18.

	Alternative 1 No Action/No Grazing	Alternative 2 No Change/Current Management	Proposed Action Grazing with Adaptive Management
Water quality	Removal of livestock grazing will increase soil stabilization.	Watersheds are protected from runoff and sedimentation by existing litter and duff.	Watersheds are protected from runoff and sedimentation by existing litter and duff.
Cultural resources	Cultural resource sites would remain in their current condition.	Current impacts to cultural resources would continue. No ground-disturbing improvements are proposed in this alternative so no new surveys would be conducted and no new sites would be discovered.	For ground-disturbing actions under this alternative, archaeological surveys will be conducted and the requirements of Section 106 of the National Historic Preservation Act and 26 CFR 800 will be met.
Social and economic resources	No employment or labor income from livestock grazing. Approximately 9 fewer jobs and 69 households affected.	Grazing activity would support nine jobs and generate \$138,375 in labor income annually.	Grazing activity would support nine jobs and generate \$138,375 in labor income annually.
T&E wildlife species determinations			
Greater sage grouse	Viability determination is <i>No impact</i> . Population trend determination is <i>Neutral effect</i> .	Viability determination is <i>May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing</i> . Population trend determination is <i>Neutral effect</i> .	
Sensitive species determinations			
Black-tailed prairie dog Burrowing owl	Viability determination is <i>No impact</i> . Population trend determination is <i>Neutral effect</i> .		
Hoary bat Plains minnow Flathead chub	No impact	May adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide.	
Swift fox, ferruginous hawk, chestnut collared longspur, loggerheaded shrike, Brewer's sparrow	May adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide.		

	Alternative 1 No Action/No Grazing	Alternative 2 No Change/Current Management	Proposed Action Grazing with Adaptive Management
Grasshopper sparrow Short –eared owl Northern harrier Northern leopard frog & plains leopard frog Ottoe skipper Regal fritillary	Beneficial impact	May adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide.	
McCown’s longspur Long-billed curlew	Loss of viability on the planning area, in a trend to federal listing, or in a loss of species viability range-wide.	May adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide.	
Fall River West GA			
Permitted AUMs	None	27,193	26,014
Seral Stage			
Late	On most of the GA, vegetation would move towards late and late intermediate seral stages while early and early intermediate seral stages would fall below desired acreage objectives in the LRMP.	Maintain current 15% over the long term	Estimated 10-30%
Late intermediate		Maintain current 64% over the long term	Estimated 50-70%
Early intermediate		Maintain current 17% over the long term	Estimated 10-20%
Early		Maintain current 3% over the long term	Estimated 1-10%
Structure			
High	Structure of the site may shift depending on the capability of the site.	Maintain current 12%	Estimated 10-30%
Moderate		Maintain current 62%	Estimated 50-70%
Low		Maintain current 26%	Estimated 10-30%
Rest	Entire project area	Average of 14%	1 to 20% annually
Paleontology	Paleontology resources would remain in current condition.	Impacts in the Wallace Ranch SIA would continue.	Wallace Ranch SIA would be fenced to exclude livestock and protect paleontology resources.



	Alternative 1 No Action/No Grazing	Alternative 2 No Change/Current Management	Proposed Action Grazing with Adaptive Management
Oglala GA			
Permitted AUMs	0	28,665	29,164
Seral Stage			
Late Seral	On most of the GA, vegetation would move towards late and late intermediate seral stages while early and early intermediate seral stages would fall below desired acreage objectives in the LRMP.	28%	10-30% with use of management options and monitoring.
Late Intermediate Seral		47%	50-70% with use of management options and monitoring.
Early Intermediate Seral		24%	10-20% with use of management options and monitoring.
Early Seral		1%	1-10% with use of management options and monitoring.
Structure			
High Moderate Low	Structure of the site may shift depending on the capability of the site.	Maintain current 20%	Estimated 25%
		Maintain current 56%	Estimated 60%
		Maintain current 24%	Estimated 15%
Rest	All acres rested	30% of acres rested	32% of acres rested
Paleontology	Paleontology resources would remain in current condition.	Current impacts to paleontology resources – particularly in the Toadstool SIA – would continue.	Design features (fencing) would protect paleontology resources in the Toadstool SIA.



# **Chapter 3**

## **Affected Environment and Environmental Consequences**

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Project Area

Rangeland Vegetation

Rare Plants

Endangered, Threatened, Proposed,  
Candidate, Sensitive, and  
Management Indicator Species

Climate Change

Water Quality

Cultural Resources

Paleontological Resources

Recreation Resources

Social and Economic Resources

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## CHAPTER 3

# AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

### Changes Between Draft and Final

Location in document	Change
Effects analysis section	Added paragraph about mineral exploration activity in parts of the project area.
Table 3-1. Past, present, reasonably foreseeable future actions	Removed mountain pine beetle thinning from the reasonably foreseeable future actions because the proposed project area burned in August 2012.
Rangeland vegetation – Oglala GA	The effects of the 2012 fire have been added to the discussion in these sections.
Rare Plants	Affected environment section updated to reflect the 2012 fire.
Cultural Resources	Removed section on programmatic agreements to reflect the current agreement with the Nebraska and South Dakota state historic preservation offices.
Existing condition section	Added a paragraph describing and listing proposed actions that would be subject to the regular Section 106 process.
Recreation	An analysis of effects to the recreation opportunity spectrum (ROS) and scenic integrity objectives (SIOs) was added in response to comments received on the DEIS.
Rangeland vegetation, rare plants, wildlife (sage-grouse and Brewer's sparrow), cultural resources, water quality, and recreation sections	Added effects analysis of potential sagebrush seeding or planting under alternative 3. This adaptive option could affect seven allotments in the Fall River West GA.

## Introduction

### Project Area

The **Oglala GA** consists of the Oglala National Grasslands, which are located in the northwestern portion of Nebraska (see figure 1-1, vicinity map, in chapter 1). This GA consists of 94,174 acres of national forest system (NFS) land, which are divided into thirty-five allotments. It is not a contiguous parcel of land; interspersed among the NFS lands are lands owned by private individuals and by the state of Nebraska. The topography of the area is a blend of rolling plains, pine covered hills, and badlands, including highly eroded benches, clay

hardpan, and bluffs. Drainages flow primarily to the south and east in the southern portion of the GA and to the north and east on the northern portion. Elevations range from 3,600 to 4,700 feet above sea level. Clayey soils predominate, with combinations of silty, limy, pan spots, and saline soils occurring as well.

The Oglala GA has three management areas (MAs), each with a particular emphasis or theme. The 2001 *Land and Resource Management Plan, Nebraska National Forest and Associated Units* (LRMP) contains more information on management areas. The first is MA 2.1, Special Interest Areas (2,076 acres). MA 2.1 is managed to protect or enhance and, where appropriate, develop and interpret for public education and recreation, areas with unusual characteristics. Two of the four special interest areas (SIAs) are developed recreation facilities – Hudson-Meng Research and Education Center and Toadstool Park. Toadstool Park has a campground which is fenced from livestock access. The Warbonnet/Yellowhand SIA contains two monuments that are fenced from livestock access. The Quaking Aspen Stand SIA features the only quaking aspen stand on the national grassland. Aside from the developed sites, recreation occurs throughout the area (wildlife viewing, mountain biking, hiking, camping, rockhounding, fishing, and hunting for big game, upland game, and waterfowl).

The second management area is 5.12, General Forest and Rangelands: Range Vegetation Emphasis (~2,000 acres). These acres are managed for the sustainability of physical, biological and scenic values associated with woody vegetation and open grassland. The third is Management Area 6.1, Rangeland with Broad Resource Emphasis. This management area is the largest and makes up the rest of the acres in the GA. These acres are managed to meet a variety of ecological conditions and human needs, including livestock grazing.

The Oglala GA has been part of the U.S. forest system since 1954. Cattle or sheep have been permitted to graze in the GA; however, there have been no sheep authorized since the 1940s. The GA is divided into 35 allotments, each consisting of one to eight separate pastures. Currently, one term grazing agreement is issued on the GA to the Sugarloaf Grazing Association. The association is governed by a board of five members and has thirty-two members. The association is permitted 24,652 animal unit months.

There are also two direct permits issued to individuals on the Indian-Brush Creek allotment. This allotment contains thirteen pastures in Nebraska and South Dakota. There are eight pastures (9,117) acres on the Oglala GA and five pastures (5,932) acres on the Fall River West GA for a total of 15,049 acres. In addition, there are five private land pastures included in the allotment. The permittees are currently authorized 3,155 animal unit months use on the national grassland portion of the allotment.

In response to the recent droughts, the Pine Ridge Ranger District range staff monitored range readiness on an allotment basis and delayed turn-on when necessary. In addition, the range staff monitored the utilization of each pasture during the grazing period using the ocular utilization protocol. When utilization reached 50%, the cattle were moved to the next pasture in the rotation or taken home. Occasionally, association members chose to reduce the number of animals instead of the duration of grazing. As the drought eased, normal animal numbers and grazing schedules were restored.

The Oglala GA contains primarily Canada thistle infestations. The Canada thistle exists along riparian areas and stock dams. Sources of invasive species establishment and/or spread in the

project area include transportation systems, wildfire, recreation, livestock and wildlife, and waterways and utility corridors.

In August 2012, fire burned 22,966 acres of private land and 6,764 acres of NFS land in and around the project area. The NFS acres that burned were in the Roundtop, Eagle Eye, Badlands, and Sand Creek allotments of the GA. Areas with moderate to high soil burn severity occurred on the extremely steep slopes. These soils are susceptible to erosion and downslope movement. This susceptibility will continue until ground cover can be established. Wind-caused erosion is also expected due to the lack of effective ground cover (litter, vegetation) caused by the fire. Estimated vegetation recovery period is one to three years for the grassland areas and more than three years for areas with woody vegetation and moderate to high soil burn severity (USDA Forest Service 2012a).

**The Fall River West GA** is in the southwestern portion of Buffalo Gap National Grasslands located in southwestern South Dakota (see figure 1-1, vicinity map, in chapter 1). This GA consists of 119,856 acres and is divided into forty-one allotments each with one to nine separate pastures. It is not a contiguous parcel of land; Forest Service lands are interspersed with private and state-owned lands. The topography of this geographic area is a blend of rolling hills, plateaus, and flat bottomlands that drain into the Cheyenne River and its tributaries. Elevations range from 3,600 to 4,200 feet above sea level. Soils are generally thin and the southern portion of this area includes exposed clays and hardpan.

The Fall River West GA has three management areas. The emphasis for MA 2.1 and MA 6.1 was described previously in the Oglala GA section.

- ◆ MA 2.1 Special Interest Area (SIA)
- ◆ MA 3.64 Special Plant & Wildlife Habitat
- ◆ MA 6.1 Rangeland with Broad Resource Emphasis.

The Fall River West GA has four SIAs for a total of 2,260 acres: Edgemont Shark Locality, Marietta South, One-Mile Hill, and Wallace Ranch Localities. MA 6.1 makes up 61,940 acres in the GA.

MA 3.64, Special Plant and Wildlife Habitat, is managed to maintain and enhance specific plant and wildlife species and communities. The Fall River West GA has three MA 3.64 areas for a total of 55,850 acres: the sage-grouse management area, the swift fox management area, and Crowe Dam.

Severe drought has impacted the Fall River West GA. Although native prairie plants are well adapted to low and variable precipitation, substantial reductions in plant cover and vigor occur under serious, prolonged drought. In response to the drought, the Fall River Ranger District implemented the following actions where necessary: reduced authorized numbers and/or season, more rapid rotations, changed season of use, later-than-normal turn-on dates, and early removal of livestock.

Invasive species are present on the Fall River West GA and include the following South Dakota declared state and locally noxious weeds: hoary cress (whitetop), Canada thistle, Russian knapweed, salt cedar (*Tamarix*), leafy spurge, common mullein, musk thistle, and Scotch thistle. Most of the weed populations in the project area are along the drainages and the high watermark of stockdams. Weeds like common mullein, leafy spurge, and hoary cress can also be found

scattered in the upland environment. Sources of invasive species establishment and/or spread within the project area include transportation systems, wildfire, recreation, livestock and wildlife, and riparian and utility corridors.

## Effects Analysis

Chapter 3 summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. The resource specialist reports in the project record include more detailed affected environment and environmental consequences information.

The effects analysis considers direct, indirect, and cumulative effects to the resources in the project area. **Direct environmental effects** are those that occur at the same time and place as the initial action. An example would be on-site soil compaction from rubber-tired skidders harvesting timber. **Indirect environmental effects** are caused by the action, but occur later in time or are spatially removed from the action. An example would be downwind effects of a power plant on air quality.

**Cumulative effects** are a combination of direct and indirect effects of an alternative combined with the effects of past, present, and foreseeable future activities undertaken by either the Forest Service or other parties. The spatial and temporal boundaries for the cumulative effects analyses vary by resources. The spatial boundary is defined in the resource sections. The temporal boundary for the cumulative effects analysis is the length of the grazing permits or ten years.

In addition to the activities listed in table 3-1, the ID team also evaluated potential for effects from the recent oil and gas exploration in the project area. While mineral leases have been sold and there is one exploratory well being drilled on private land, this activity is too preliminary and speculative to include in the cumulative effects analysis for the project.

**Table 3-1. Past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis for allotment management planning in the Fall River West and Oglala GAs.**

Project/Activity	Location	Description
Sagebrush spraying	Fall River West GA	Reduced the amount of sagebrush habitat for greater sage-grouse <b>Past action</b>
Fossil theft	Project area	Damage and removal of paleontology resources <b>Past, present, reasonably foreseeable future action</b>
Land exchanges	Project area	May lose or gain pastures. Sand Creek land exchange 760 acres would transfer from federal to private ownership: pasture 42 and part of pasture 38E in the Sand Creek allotment. This allotment is currently under permit to the Sugarloaf Grazing Association.



Project/Activity	Location	Description
Land exchanges, cont.		<p>800 acres would transfer from private to federal ownership: 40 acres would become part of the Horn allotment and continue to be under permit to the Sugarloaf Grazing Association and 760 acres would be permitted to the Sugarloaf grazing association and managed as a one allotment-one pasture forage reserve.</p> <p>Cain Creek land exchange: 1,226 acres in four allotments (DeGering, Miller, Stearns, and Warbonnet) would transfer from federal to private ownership.</p> <p><b>Reasonably foreseeable future actions</b></p>
Travel management	Project area	<p>Confines public motorized use to specified roads.</p> <p><b>Present, reasonably foreseeable future action</b></p>
Upland game bird (grouse) hunting	Project area	<p>This activity occurs statewide in both Nebraska and South Dakota and is managed by the state game agencies. The Nebraska season runs from September 1 to January 31 annually. The South Dakota season runs from about mid-September to early January annually.</p> <p><b>Past, present, reasonably foreseeable future action</b></p>
Black-tailed prairie dog management	Project area	<p>Decisions for boundary management and interior management of prairie dog populations have been made (USDA Forest Service 2005, USDA Forest Service 2008). The two decisions prescribe the acres of prairie dogs that will be maintained in each geographic area and where and when control will take place.</p> <p><b>Past, present, reasonably foreseeable future action</b></p>

## Rangeland Vegetation

### Affected Environment – Oglala Geographic Area

For the Oglala GA, all allotments were inventoried in the 1960s to determine the current condition and trend of rangeland health. All but one allotment were inventoried again in the late 1980s or 1990s, and many allotments were inventoried in 2008-2010. These inventories used the following protocols: ocular plant composition, Parker 3-step, and Natural Resources Conservation Service (NRCS) range analysis. In addition, the primary riparian areas were evaluated using the green ash/snowberry or cottonwood habitat ecological classification scorecards (Dr. Daniel Uresk) to determine seral stage and trend. For more information on the inventories, see appendices B and C of the rangeland vegetation specialist report for the Oglala GA.

Ongoing monitoring has been done with the following methods. The methods are described in detail in the 1996 *R2 Rangeland Analysis and Management Training Guide*.

- ◆ Ocular estimate to measure utilization.
- ◆ Proper functioning condition (PFC) and Great Plains riverine scorecard to assess riparian areas.
- ◆ Visual obstruction reading (VOR or Robel pole) to estimate vegetation structure.
- ◆ NRCS similarity index to determine rangeland health and condition trend.

Allotment folders and records, which include photos, species lists, historical inventory and monitoring data, field notes, summaries, and maps are on file at the Pine Ridge Ranger District.

### ***Existing Condition***

The upland grassland is the primary vegetation/habitat type. Mid grasses dominate, but the communities include short graminoids, a variety of forbs, and some shrubs. This mixed grass prairie is made up of cool-season and warm-season plants that provide diverse habitat and forage for wildlife and domestic livestock. The principle graminoids are western wheatgrass, green needlegrass, buffalograss, blue grama, and sedges. Dominant forbs are woolly plantain, wallflower, yarrow, scarlet globemallow, and species of scurfpeas and vetches. Dominant shrubs are yucca, pricklypear, broom snakeweed, and several sage species. Dominant ecological sites throughout the GA are clayey, limy upland, shallow clay, and shallow limy.

Riparian areas and woody draws comprise a small percentage of the total area of the Oglala GA. However, they provide the highest diversity of plant and animal species. Principle woody species are cottonwood, green ash, boxelder, and willow.

An extension of the Pine Ridge escarpment extends onto the Oglala GA at the Roundtop/Eagle Eye area. Parts of this escarpment are extremely rugged, making livestock grazing difficult but providing good forage and cover for wildlife such as bighorn sheep, elk, and turkey and providing protected areas for unusual plant species. Historically, this forested area included ponderosa pines, chokecherry, snowberry, prairie sandreed, and little bluestem in addition to the species in the surrounding GA.

In August 2012, a wildland fire burned 22,966 acres of the Roundtop/Eagle Eye area. Areas with moderate to high soil burn severity occurred on the extremely steep slopes. These soils are susceptible to erosion and downslope movement. This susceptibility will continue until ground cover can be established. Wind-caused erosion is also expected due to the lack of effective ground cover (litter, vegetation) caused by the fire. Estimated vegetation recovery period is one to three years for the grassland areas and more than three years for areas with woody vegetation and moderate to high soil burn severity.

Numerous badland areas can be found throughout the Oglala GA. These areas provide some forage for livestock grazing and wildlife as well as a unique habitat for plants and animals.

### ***Desired Conditions***

Upland grasslands will be managed to perpetuate diverse and healthy mixed grass and forb communities. They will be managed to provide sufficient residual cover for wildlife species requiring higher grassland vegetation structure.

Riparian areas should be in or trending towards properly functioning condition (PFC), which allows them to recover quickly from floods and support diverse native plants and animals. They will be managed to maintain soil moisture to perpetuate riparian plant communities with strong root masses with healthy submergent and emergent vegetation cover along streams and shorelines while reducing sediment levels to maintain high quality aquatic habitat. They should be managed to maximize riparian vegetation such as sedges, rushes, willows, cottonwoods, and green ash.

Woody draws will be managed to perpetuate multiple layers and age classes of vegetation including herbaceous plants, shrubs, and trees.

The desired condition for the Roundtop/Eagle Eye area changed following the 2012 fire. In the immediate future, weed management and erosion control will be a priority. In areas of high severity burn, annual brome grasses may be a concern. In many areas, other early seral stage vegetation will colonize. In areas of low severity burn, the roots of the later seral vegetation survived and will provide high-quality ground cover.

The long-term desired conditions for the ponderosa pine forest/parklands include a diversity of healthy and vigorous ponderosa pine forest, old growth stands of large old trees with open branches, intermingled standing dead and down trees, and mixed grass and forb communities providing a mosaic of varying grassland structure levels. However, this condition will be not met for many years.

The LRMP sets objectives for seral stage and structure in each geographic area. The following tables list the desired seral stages and structure for the Oglala GA and the current percentages.

**Table 3-2. Oglala GA desired and current condition for seral stage.**

	Seral Stage			
	Late	Late Intermediate	Early Intermediate	Early
LRMP objective	10 to 30%	50 to 70%	10 to 20%	1 to 10%
Current condition	28%	47%	24%	1%

**Table 3-3. Oglala GA desired and current condition for structure.**

	High	Medium	Low
LRMP objective	10 to 30%	50 to 70%	10 to 30%
Current condition	20%	56%	24%

## Environmental Consequences – Oglala Geographic Area

### *Alternative 1 – No Action: No livestock grazing*

**Direct and Indirect Effects:** Under this alternative, livestock would not be permitted to graze on national forest system (NFS) lands in the geographic area, and infrastructure would not be maintained (e.g., windmills, tanks and fences).

In the short-term, there would be an increase in frequency and cover of desirable species, reduction of weeds around water sources, and improved plant vigor in early seral and early intermediate seral stages. Litter would increase. Grassland and riparian trends would be upward until species composition reached or approached the historic climax plant community (HCPC). At this point, early and early intermediate seral stages would fall below desired acreage objectives in the forest plan. Ultimately, there would be excessive litter and decadence, and there would be a gradual downward trend.

Some riparian or woody draw areas are grazed for part of the season and there is data indicating a downward trend in the following allotments and pastures:

- ♦ Antelope Creek allotment, pasture 12.
- ♦ Long Branch allotment, pasture 21E.
- ♦ Sand Creek allotment, pasture 42.
- ♦ Warbonnet allotment, pasture 15, Antelope Creek section.

In these areas, it is likely conditions would initially move toward properly functioning condition (PFC) for those areas not currently meeting PFC. This is due to reducing the adverse impact that cattle can have, mostly by grazing hardwood seedlings, trampling and soil compaction. Eventually, however, there would be less recruitment of seedlings because livestock hoof action would be eliminated and grasses would outcompete any hardwood seedlings.

Data collected on Indian Creek pasture 1N show a significant increase in all age classes of cottonwood, willow and other shrubs since the implementation of a high-intensity, short-duration, early spring grazing system in 1991. Much of this success has been attributed to the cattle hoof action along the creek, scouring of the gravel beds, short-term reduction of vegetation competing with seedling establishment and removal of livestock after 14 days. Riparian areas that are rested from any livestock grazing do not show a significant increase in hardwood seedlings.

**Cumulative effects:** The Sand Creek land exchange could have a short-term, localized positive effect on rangeland vegetation because the acquired parcel (800 acres) would not be grazed under this alternative; the relinquished parcels would continue to be grazed under private ownership. Implementation of travel management rules has limited the number of access roads on the OGA that are open to the public for motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. Combined with the removal of livestock grazing, rangeland vegetation condition would improve in the short-term, but the long-term impacts of these actions would lead to vegetation conditions that exceed forest plan objectives for late intermediate and late seral stages and fall below forest plan objectives for early and early intermediate seral stages.

### ***Alternative 2 – No Change: No change from current grazing management***

Under this alternative, livestock grazing would continue with current allotment management plans (AMPs) or in the absence of such a plan, under the annual operating instructions (AOIs). Only improvements authorized in an existing AMP would be developed. Permitted numbers and seasons would remain unchanged except for annual adjustments by exception,

and in response to long-term monitoring and related decisions as described in FSH 2209.13 R2 ID.

**Direct and indirect effects:** Existing upland vegetation and riparian conditions and trends would continue. Existing reproductive vigor of plants and species and community composition would continue. Riparian areas would likely continue in the trend they currently are heading.

This alternative would have more immediate adverse effects for upland vegetation conditions than alternative 1. However, it would still be possible to maintain vegetation health using administrative actions. Lack of management flexibility is a limiting factor of this alternative in comparison with alternative 3.

**Cumulative effects:** There would be no additional impacts to rangeland vegetation from the Sand Creek land exchange because the livestock grazing would continue on both the acquired and relinquished parcels. Implementation of travel management rules has limited the number of access roads on the Oglala GA that are open to the public for motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. The improvement in vegetation condition would occur over a small area compared to the total area affected by current livestock management so any change in vegetation would be negligible.

### ***Alternative 3 – Proposed Action: Graze with adaptive management grazing practices and associated activities***

Under this alternative, livestock grazing would be implemented by incorporating adaptive management to meet LRMP goals, objectives, standards, and guidelines.

**Direct and indirect effects:** The adaptive management options available under alternative 3 would improve vegetation health and diversity conditions in riparian areas. In addition, utilization would be improved in many allotments, and plants would have more opportunity to recover from grazing impacts. Several allotments would benefit from improving water availability. Others would benefit from hardwood seedling establishment. Plant reproductive ability and vigor would continue to improve in many areas. Changes in species, plant community composition, and cover would occur more rapidly than under alternative 2.

**Cumulative effects:** There would be no additional impacts to rangeland vegetation from the Sand Creek land exchange because the livestock grazing would continue on both the acquired and relinquished parcels. Implementation of travel management rules has limited the number of access roads on the Oglala GA that are open to the public for motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. The improvement in vegetation condition would occur over a small area compared to the total area affected by proposed changes in livestock management so any change in vegetation would be negligible.

## **Affected Environment – Fall River West Geographic Area**

### ***Existing Condition***

The dominant vegetation includes western wheatgrass in the uplands, with scattered cottonwood and chokecherry communities. A few ponderosa pine trees can be found along the escarpment of Fiddle Creek. There are several areas of crested wheatgrass occupying clayey range sites that were once farmed. Scattered greasewood communities can be found along creek bottoms throughout the geographic area.

A significant sagebrush community lies north of the Black Hills Army Ordnance Depot and is designated as a 3.64 management area for greater sage-grouse. A 2004 study determined that seven pastures contained adequate sagebrush for greater sage-grouse nesting and winter habitat. Currently, no areas are being managed for sagebrush expansion.

Grassland structure in the Fall River West GA has never been measured; the presence of sagebrush makes the data difficult to interpret. Two methods are being used to evaluate range structure in the area: droop height of herbaceous vegetation and stocking rates. Areas grazed at a high intensity (stocked at 10 – 20% heavier than the NRCS suggested stocking rate) are considered to have low structure. Areas grazed at moderate intensity (stocked at 70 – 100% of the NRCS suggested stocking rate) are considered to have moderate structure. Areas grazed at low intensity (stocked at 30 – 40% lighter than NRCS suggested stocking rate) are considered to have high structure. Current structure conditions for the Fall River West GA are as follows: 12% is high, 62% is moderate, and 26% is low. Allotment folders and records, which include photos, species lists, historical inventory and monitoring data, field notes, summaries, and maps, are on file at the Fall River Ranger District.

Woody draws comprise a small percentage of the total area of the Fall River West GA. However, they provide the highest diversity of plant and animal species in the GA. Principle woody species include cottonwood, green ash, American elm, chokecherry and snowberry.

Prairie dog colonies are scattered throughout the GA in the upland grassland vegetation. They provide low structure habitat for a number of species.

### ***Desired Conditions***

Upland grasslands will be managed to perpetuate diverse and healthy mixed grass communities that provide a mixture of grassland structure levels. Woody draws will be managed to perpetuate multiple layers and age classes of vegetation, including herbaceous plants, shrubs, and trees.

The desired condition of the rangeland is to have certain percentages of the rangeland at late, late intermediate, early intermediate and early seral stages and in high, medium, or low structure as shown in the following tables.

**Table 3-4. Fall River West GA desired and current condition for seral stage.**

	<b>Late</b>	<b>Late Intermediate</b>	<b>Early Intermediate</b>	<b>Early</b>
LRMP objective	10 to 30%	50 to 70%	10 to 20%	1 to 10%
Current condition	15%	64%	17%	4%

**Table 3-5. Fall River West GA desired and current condition for structure.**

	<b>High</b>	<b>Medium</b>	<b>Low</b>
LRMP objective	10 to 30%	50 to 70%	10 to 30%
Current condition	12%	62%	26%

Riparian areas should be in or trending towards properly functioning condition (PFC), which allows them to recover quickly from floods and support diverse native plants and animals. They will be managed to maintain soil moisture to perpetuate riparian plant communities with strong root masses with healthy submerging and emergent vegetation cover along streams and shorelines while reduction sediment levels to maintain quality aquatic habitat.

The sagebrush community north of the Black Hills Army Ordnance Depot is designated as MA 3.64 for greater sage-grouse. The desired conditions for this area are as follows:

- ◆ ... provide quality nesting cover in all sagebrush stands within at least 3.0 miles of active display grounds (consistent with GA vegetation objectives) where sagebrush is irregularly distributed around the display ground. A minimum distance can be reduced to 2.0 miles where sagebrush is uniformly distributed around display grounds.
- ◆ Maintain or enhance wet and sub-irrigated meadows, seeps, riparian habitats, and other wetland areas that occur in or adjacent to sage-grouse habitat as quality sage-grouse foraging areas during the spring, summer, and fall.
- ◆ Maintain or increase the size of big sagebrush patches in sage-grouse habitat.
- ◆ Maintain small openings within big sagebrush stands at a maximum ratio of 1 acre of opening to 3 acres of shrub.
- ◆ Manage for high vegetation structure in areas where it would enhance sage-grouse nesting habitat.

This direction applies to the following eleven pastures:

- ◆ Beebe-Markey allotment: Winter pasture
- ◆ Cottonwood Group allotment: West and Childers pastures
- ◆ Ellison Dam allotment: Soper and Fossil Point pastures
- ◆ Porter allotment: West Dry Creek and Sheaman pasture
- ◆ Tubbs allotment: East Dry Creek, School, and Fritz pastures
- ◆ West Porter allotment: North pasture.

The desired condition for the 9,450-acre swift fox management area is to provide a mosaic of low, moderate, and high grassland structure in occupied swift fox habitat, consistent with

vegetation objectives for the geographic area. This management area is located approximately 2 miles east of Ardmore, SD north of County Road 5.

Crowe Dam is a 250-acre special wetland/aquatic habitat area. The desired condition for this area is to manage vegetation to establish and maintain quality nesting and brooding habitat on adjacent upland grasslands for waterfowl and associated wildlife within ten years.

Prairie dog colonies in the geographic area will be managed to meet direction in the existing decisions listed below. The two decisions prescribe the acres of prairie dogs that will be maintained in each geographic area and where and when control will take place. Prairie dog colonies could be part of meeting the low vegetation structure objective of 10% to 30% shown in the table above.

- ♦ *Black-Tailed Prairie Dog Conservation and Management on the Nebraska National Forest and Associated Units.* Completed in 2005, this decision prescribes how prairie dogs populations will be managed in a boundary zone between national forest system land and adjoining private land.
- ♦ *Black-Tailed Prairie Dog Management on the Nebraska National Forest and Associated Units.* Completed in 2008, this decision describes management of prairie dog populations in the areas inside the boundary management zones.

## Environmental Consequences – Fall River West Geographic Area

### *Alternative 1 – No Action: No livestock grazing*

**Direct and indirect effects:** Upland vegetation seral stage would be expected to move towards a later seral stage faster than alternative 2 and alternative 3. The majority of the GA would move towards late and late intermediate seral stages while early and early intermediate seral stages would fall below desired acreage objectives in the LRMP. Improvement in plant health would occur rather quickly on some sites as an increase in plant litter and residual vegetation would contribute to better soil moisture retention and protection from runoff and erosion. There would be an increase in frequency and cover of desirable species, reduction of weeds around water sources, and improved plant vigor.

Plant species composition would most likely move toward taller plant species, thus also trending toward a higher structure class. Herbaceous production would be maximized (depending on climate conditions) in the short-term as plant vigor increases. Litter accumulation could eventually shade out desirable plants and cause a decline in species vigor, diversity, and production in some areas. Over the long-term, seral stages could decline due to lack of a disturbance in some plant communities that have evolved with grazing or other disturbances.

Riparian vegetation health would likely increase initially due to less impacts from browsing and trampling. Hardwood draw areas would be expected to thrive initially with understory vegetation of shrubs and grass species and potentially move toward a late seral stage dominated by old age classes of cottonwood or green ash with few intermediate age classes or small seedlings. Riparian areas that are rested from any livestock grazing do not show a significant increase in hardwood seedlings. Data collected on Indian Creek within pasture 1N has resulted in a significant increase of all age classes of cottonwood, willow and other shrubs



since the 1991 implementation of a high intensity, short duration grazing system with grazing in early spring. Much of this success has been attributed to the cattle hoof action along the creek, scouring of the gravel beds, short term reduction of vegetation competing with seedling establishment, and removal of livestock after 14 days. This allowed the entire growing season for hardwood seedling establishment.

The removal of livestock grazing may adversely affect the density of sagebrush plants by increasing the health and vigor of the understory herbaceous plant species thereby providing more competition to sagebrush seedling establishment.

New noxious weed infestations would likely decrease because of less disturbance and importation of seed from livestock. However, seeds would still be introduced by recreation users and wildlife. Infestations may grow at slower rates because of increased competition from desirable native species.

**Cumulative effects:** Sagebrush spraying, travel management, and the Cain Creek land exchange are the activities listed in table 3-1 with the potential for effects on rangeland vegetation. Removing livestock grazing could adversely impact sagebrush and when combined with sagebrush spraying, the overall cumulative effects on sagebrush would be negative.

Implementation of travel management rules limited the number of access roads open for public motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. Combined with the removal of livestock grazing, rangeland vegetation condition would improve in the short-term, but the long-term impacts of these actions would lead to vegetation conditions that exceed forest plan objectives for late intermediate and late seral stages and fall below forest plan objectives for early and early intermediate seral stages.

If the Cain Creek land exchange takes place, 1,226 acres of federal land in the Fall River West GA would transfer to private ownership. Cumulative effects from the land exchange combined with effects from alternative 1 would be insignificant because the land exchange affects less than 1% of the total acres in the Fall River West GA.

### ***Alternative 2 – No Change: No change from current grazing management***

**Direct and indirect effects:** Existing upland vegetation and riparian conditions and trends would continue. Trend in condition of plants and species and community composition would continue. Riparian and woody draw vegetation is expected to be maintained under this alternative. Current trends in hardwood draw areas would be expected to continue.

Big sagebrush would continue to be a key component of the species composition in MA 3.64. Initially, current livestock grazing could positively affect the density of sagebrush plants in these areas by decreasing the health and vigor of the herbaceous plant species, which would provide less competition to sagebrush seedling establishment. However, because most of the areas identified for sagebrush expansion are stocked at high capacity, ultimately this alternative would lead to trampling of new sagebrush seedlings.

**Cumulative effects:** Sagebrush spraying, travel management and the Cain Creek land exchange are the activities listed in table 3-1 with the potential for effects on rangeland vegetation. Across the GA, the effects of reducing sagebrush via spraying and the positive

benefits to sagebrush from grazing would result in a neutral effect – loss of sagebrush in some areas and increased sagebrush density in others.

Implementation of travel management rules limited the number of access roads open for public motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. The improvement in vegetation condition would occur over a small area compared to the total area affected by current livestock management so any change in vegetation would be negligible.

If the Cain Creek land exchange takes place, 1,226 acres of federal land in the Fall River West GA would transfer to private ownership. Cumulative effects from the land exchange combined with effects from alternative 2 would be insignificant because the land exchange affects less than 1% of the total acres in the Fall River West GA.

### ***Alternative 3 – Proposed Action: Graze with adaptive management grazing practices and associated activities***

**Direct and indirect effects:** The adaptive management options available under alternative 3, in particular grazing deferment and/or lighter grazing intensities, would improve vegetation health and diversity. A mix of both cool- and warm-season grass species would be represented in plant communities. Late seral stage conditions would increase.

Plant reproductive ability and vigor would continue to improve in many areas, and changes in species, plant community composition, and cover would occur more rapidly than under alternative 2. Vigor and seral status of riparian and hardwood draw vegetation is expected to increase.

Areas managed for sage-grouse would have high structure. If successful, the future option of sagebrush seeding or planting would increase sagebrush habitat in seven allotments. Areas managed for swift fox would have a mosaic of structure, and areas managed for prairie dogs would have low structure.

**Cumulative effects:** Sagebrush spraying, travel management and the Cain Creek land exchange are the activities listed in table 3-1 with the potential for effects on rangeland vegetation. Across the GA, the effects of reducing sagebrush via spraying and the positive benefits to sagebrush from grazing would result in a neutral effect – loss of sagebrush in some areas and increased sagebrush density in others.

Implementation of travel management rules limited the number of access roads open for public motorized travel. Closing certain roads would cause rangeland vegetation to respond positively, both allowing native plant populations to improve and reducing invasion by noxious weeds. The improvement in vegetation condition would occur over a small area compared to the total area affected by current livestock management so any change in vegetation would be negligible.

If the Cain Creek land exchange takes place, 1,226 acres of federal land in the Fall River West GA would transfer to private ownership. Cumulative effects from the land exchange combined with effects from alternative 3 would be insignificant because the land exchange affects less than 1% of the total acres in the Fall River West GA.

## Rare Plants and Rare Plant Communities

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### Introduction

This section is a summary of the more detailed discussion of rare plant species and rare plant communities found in the botany resource report. Threatened, endangered, sensitive, and proposed (TESP) plant species are discussed in the wildlife TESP section.

The LRMP has several goals/objectives and standards/guidelines that deal the interaction of livestock grazing and rare plants and rare plant communities.

- ♦ Under Goal 1: Ensuring sustainable ecosystems, goal 1.b states, “Provide ecological conditions to sustain viable populations of native and desired non-native species.” Under this goal, two objectives are pertinent. Objective 5 states, “Identify rare plant and animal communities, inventory them, and develop associated management strategies to conserve them.” Objective 8 states, “Complete and initiate implementation of conservation strategies for globally rare plant species (G2-3 rankings) including Dakota buckwheat and Barr’s milkvetch and other high-priority species in cooperation with other conservation agencies and organizations.”
- ♦ Under Biological Resources – F. Fish, Wildlife and Rare Plants, guidelines 7, 10, and 11 deal with managing native forbs, wetlands, riparian habitats, wooded draws, and woody thickets using livestock grazing strategies.
- ♦ Under Biological Resources – Threatened, Endangered and Proposed Species, Guideline 25 states, “Identify sensitive plant habitats and rare plant communities as priorities for invasive plant monitoring and control.” Standard 27 states, “As opportunities arise, design timing, intensity and frequency of mowing, burning and livestock grazing to maintain and/or increase populations of sensitive plant species and the health of rare plant communities.”

### Affected Environment

To satisfy the direction in the LRMP, rare plant species that could be found in the Oglala and Fall River GAs were determined according to their rankings in the comprehensive conservation strategies (Natural Legacy Projects) developed by Nebraska and South Dakota. These natural legacy projects identify the states’ rarest species and habitats and identify strategies to conserve them.

The LRMP provides guidance on identifying, inventorying, and managing the rare plant species and rare plant communities in the Nebraska National Forests and Grasslands (NNFG). This includes working with the Nebraska and South Dakota state agencies in this effort.

### ***Existing Condition***

In the Oglala GA, there could be 91 rare plant species. In the Fall River West GA, there could be 5 rare plant species. Most of these have been found in their expected habitats. Rare plant communities that could be found in both GAs were determined from state information. The source for Nebraska rare plant communities is the Nebraska Game and Parks Commission and the Nebraska Natural Heritage Project. The source for South Dakota rare plant communities is the Association for Biodiversity and The Nature Conservancy. In the Oglala GA, there are ten rare plant communities. In the Fall River West GA, there are four rare plant communities.

The rare plant communities on the Oglala GA are the following:

- ♦ Green ash – elm – hackberry canyon bottom woodland
- ♦ Ponderosa pine forest
- ♦ Dry-mesic ponderosa pine woodland
- ♦ Skunkbush sumac shrubland
- ♦ Freshwater seep – spring-type
- ♦ Buffaloberry shrubland
- ♦ Silver sagebrush shrub prairie
- ♦ Greasewood shrub prairie
- ♦ Playa wetland
- ♦ Spikerush vernal pool

The first five of these have been found in the Roundtop/Eagle Eye area. They have not been found anywhere else in the project area. These areas could harbor up to 47 of the rare plants in this GA. However, the plant communities may have been affected by the 2012 fire; the extent of the damage is currently unknown. The last five of these are found scattered on the Oglala GA in relatively isolated areas. They could harbor up to fifty-one of the rare plants in this GA. Two of these communities – playa wetland and spikerush vernal pool – are found in only a few areas in the GA and are among the most vulnerable plant communities in Nebraska.

There are four rare plant communities on the Fall River West GA:

- ♦ Shale barren slopes vegetation
- ♦ Saltgrass – foxtail barley – Nuttall’s alkali grass – sea-blite herbaceous vegetation
- ♦ Prairie cordgrass – sedge species herbaceous vegetation
- ♦ Ill-scented sumac / threadleaf sedge shrub herbaceous vegetation.

The first is found in one area at the intersection of the Antelope, West Association, and East Association allotments. The second is found in the Plumb-Henry allotment. The third is possibly found in the Cottonwood Group, Simons, and Fuchs allotments. The fourth is found in the Cottonwood Group allotment. None of the rare plant species identified for the Fall River GA has been found in any of these rare plant communities.

### ***Desired Condition***

The desired condition for sensitive plant species and the health of rare plant communities is to maintain and/or increase populations (LRMP; fish, wildlife, and rare plants standard 27). In general, this desired condition applies to rare plant communities in both GAs. The exception is the portion of the Oglala GA that burned in the 2012 fire.

For the areas where the fire burned with a high severity, the initial desired condition is to protect rare plant communities and their habitat by minimizing infestations of invasive plant species and to establish desired ground cover. High severity fire in these areas likely destroyed any root crowns, leaving no vegetation to compete with invasive plants.

Recommendations from the burned area emergency response (BAER) team include herbicide treatments to control noxious weed infestations and facilitate recovery of native vegetation (USDA Forest Service 2012a); however, the severely burned areas may require seeding to re-establish desired plant species.

Plants in the moderately burned areas are likely to still have viable root crowns. In these areas, the desired condition is also to control invasive plant infestations, but herbicide treatment may be sufficient to re-establish desired plant species.

## **Environmental Consequences**

### ***Alternative 1 – No Action: No livestock grazing***

Green ash – elm – hackberry canyon bottom woodland communities would benefit from less trampling and foraging of seedlings. However, there would also be less disturbance caused by herbivores. This would eventually reduce the community vigor by reducing seeding sites. The plant complexes on the rich north-facing slopes of the canyons and draws would probably expand into previously grazed areas. Impacts from the 2012 fire on these communities have not been determined.

Playa wetland, spikerush vernal pool, freshwater seep, and saltgrass – foxtail barley – alkali grass – sea-blite herbaceous vegetation communities would benefit most from no grazing. Eventually, however, these communities would also suffer from too much litter and too little disturbance.

The skunkbush sumac shrubland, buffaloberry shrubland, silver sagebrush shrub prairie, and greasewood shrub prairie communities would initially benefit from no grazing. However, fine fuels and litter would increase. Fire in these environments could do serious, long-term damage to the shrubs and the community. Impacts from the 2012 fire on these communities have not been determined.

Ponderosa pine forest and dry-mesic ponderosa pine woodland burned in the 2012 fire leaving only small pockets of forested vegetation. Initially, these areas would benefit by removing grazing. However, over time, as fine fuels and litter increase from lack of grazing, fire would once again be more of a danger.

If it is confirmed that prairie cordgrass – sedge species herbaceous vegetation communities exist in Cottonwood Group, Fuchs, and Simons allotments, removing livestock grazing would improve the condition of this community because these sites are often subject to heavy grazing.

Since the shale barren slopes vegetation community is sparsely populated and found on outcrops, cattle do not spend much time in this community. Removing livestock grazing would minimally improve the condition of this community.

The ill-scented sumac/threadleaf sedge shrub herbaceous vegetation community would initially benefit from no grazing. However, fine fuels and litter would increase. Fire in these environments could cause long-term damage to the shrubs and the community.

### ***Alternative 2 – No Change: No change from current grazing management***

**Direct and indirect effects:** Livestock grazing under current management could affect rare plant species and rare plant communities in the following areas in the Oglala GA. The effect on these communities is not known for certain. Monitoring would be required to determine if the rare plant species and communities are affected:

- ♦ Antelope pasture 12.
- ♦ Benedict Buttes pasture 39E – Grazing in the springtime could have a negative impact on two rare communities.
- ♦ Horn pasture 40W riparian.
- ♦ Indian – Brush Creek pasture 1N – Grazing in the springtime could have a negative impact on two possible rare communities.

Under alternative 2, some rare plant communities and rare plant species would benefit and others would not. Current range management practices have some flexibility to change grazing dates and rotations to help protect these resources. However, cattle would continue to trample, defoliate, and cause ground disturbances – sometimes to the detriment of the individual plant species and the plant community as a whole.

Any green ash – elm – hackberry canyon bottom woodland remaining after the 2012 fire would continue to have little grazing because of lack of water in these areas. Fine fuels and litter would continue to increase, and fire would be more of a danger.

The Buffalo Wallow exclosure that protects a playa wetland in the Oglala GA would continue to be maintained. The playa wetland and spikerush vernal pools in Sugarloaf Pasture 31E, Whitehead Pasture 19A, and Benedict Buttes Pasture 39E would be grazed periodically in the spring when they are most vulnerable.

The Indian – Brush Creek Pasture 1N pasture might have an artificial vernal pool and an artificial playa community with many of the characteristics and rare plant species of natural communities. Grazing in the springtime could be detrimental to these species and communities.

The saltgrass – foxtail barley – Nuttall's alkali grass – sea-blite herbaceous vegetation community in the Plumb-Henry Allotment would continue to be grazed season long, first by sheep and then by cattle. This could lead to overgrazing of the delicate wet prairie area.

Overgrazing may affect the prairie cordgrass – sedge species herbaceous vegetation communities that may exist in Cottonwood Group, Fuchs, and Simons allotments.

Grazing in the shrubland communities would continue as it has under current management, so the effects would be the same. The Indian – Brush Creek Pasture 1N pasture has silver sagebrush shrub prairie and greasewood shrub prairie communities. Grazing in this pasture could be varied by season to allow these communities to diversify and to keep invasive species in check.

Since the shale barren slopes vegetation community is sparsely populated and found on outcrops, cattle do not spend much time in this community. This alternative would minimally affect the condition of this community.

The ill-scented sumac/threadleaf sedge shrub herbaceous vegetation community would continue as it has under current management, so the effects would be the same.

### ***Alternative 3 – Proposed Action: Grazing with adaptive management grazing practices and associated activities***

**Direct and indirect effects:** Continuation of livestock grazing under this alternative would use adaptive management to focus on the identified needs for action. The adaptive management options would provide flexibility for managing the rangeland resource, and the conditions of rangeland resources and the botanical resources are closely related. In general, the better condition the rangeland resource is in, the better condition the botanical resource is in. The future options of sagebrush seeding or planting would not affect the rare plant communities in the Fall River West GA because those communities do not occur in the seven allotments where sagebrush seeding/planting might take place.

The general proposal to rest up to 30% of all acres on the Oglala GA and up to 20% on the Fall River West GA would benefit the botanical resource.

Several of the green ash – elm – hackberry canyon bottom woodland, ponderosa pine forest, and dry-mesic ponderosa pine woodland communities are already protected in the Aspen Grove / Beaver Dam and Hudson-Meng exclosures. This protection would continue. In Roundtop pastures 34E and 34W, encouraging cattle to graze more intensely the west end of 34W could impact a high quality green ash – elm – hackberry canyon bottom woodland.

Any green ash – elm – hackberry canyon bottom woodland remaining after the 2012 fire would continue to have little grazing because of lack of water in these areas. Fine fuels and litter would continue to increase, and fire could eventually be more of a danger.

The Buffalo Wallow exclosure that protects a playa wetland in the Oglala GA would continue to be maintained. Any playa wetland and spikerush vernal pools that might be in Sugarloaf Pasture 31E, Whitehead Pasture 19A, and Benedict Buttes Pasture 39E would be grazed periodically in the spring when they are most vulnerable. In years when Sugarloaf Pasture 31W riparian is not grazed in the spring, grazing 31E first would have a detrimental effect on these plant species and communities.

The Indian – Brush Creek Pasture 1N pasture might have an artificial vernal pool or an artificial playa community at the stock dam on the east end. These possible communities have many of the characteristics and rare plant species of natural communities. Grazing in the

springtime is detrimental to these species and communities. This pasture also has silver sagebrush shrub prairie and greasewood shrub prairie communities. Grazing in this pasture should be varied by season, if possible, to allow these communities to diversify and to keep invasive species in check.

Antelope Pasture 12 has a greasewood shrub prairie community. The proposal to split this pasture into riparian and upland areas, alternating grazing on the riparian area between spring and fall, and also grazing the upland in a deferred five-pasture rotation would allow this community to diversify and keep invasive species in check. The proposed rotation system and the proposed rest schedule would allow the rare community more opportunity to develop.

The Horn Pasture 40W Riparian has a silver sagebrush shrub prairie community. The proposal to alternate the grazing in this pasture between spring and fall would allow for more diversity to develop and for shrubs to be undisturbed for one growing season periodically in the four-pasture rotation.

Warbonnet Pasture 15 contains several shrub communities. Overgrazing is the primary threat. Alternating the grazing in this pasture between spring and fall would allow for more diversity to develop and for shrubs to be undisturbed for one growing season every other year.

The saltgrass – foxtail barley – Nuttall's alkali grass – sea-blite herbaceous vegetation community is found in the Plumb-Henry South Pasture. In this alternative, the stocking rate would be reduced by 20%, which would reduce impacts on the delicate wetland areas. However, sheep would continue to be grazed first every year, followed by cattle. Livestock would be on the pasture for the entire grazing season. This would not allow the health of the community to improve.

If it is confirmed that prairie cordgrass – sedge species herbaceous vegetation communities exist in Cottonwood Group, Fuchs, and Simons allotments, this alternative would provide mechanisms for protecting them if needed.

Since the shale barren slopes vegetation community is sparsely populated and found on outcrops, cattle do not spend much time in this community. Alternative 3 would minimally affect the condition of this community. However, if it is shown to be negatively affected, the adaptive management practices would provide tools for protecting it.

The ill-scented sumac/threadleaf sedge shrub herbaceous vegetation community is in the Cottonwood Group allotment, Cottonwood East pasture, where no management changes are proposed. However, the adaptive management practices in this alternative would allow more flexibility for protecting it, if necessary.

### ***Cumulative Effects from all Alternatives:***

Past, present, and reasonably foreseeable future actions that could impact rare plant communities are implementation of the travel management decision and the Sand Creek (Oglala GA) and Cain Creek (Fall River West GA) land exchanges.

**Travel management:** Implementation of travel management rules has limited the number of access roads on the Oglala and Fall River West GAs. As a whole, these travel restrictions are beneficial to rare plant species and communities. Less vehicle travel means less disturbance and fewer chances to spread invasive species which could out-compete some rare plants.



**Land exchanges:** The Sand Creek land exchange would trade Sand Creek pasture 42 for a block of land between Badlands pasture 37 and Toadstool pasture 38W. This land exchange would eliminate a riparian area (not a rare community) from Forest Service control. The cumulative effect of the land exchange and the three alternatives is unknown. An assessment of the acquired land would be necessary to determine the botanical resources and any need for action.

If the Cain Creek land exchange takes place, 1,226 acres of federal land in the Fall River West GA would transfer to private ownership. Cumulative effects from the land exchange combined with effects from alternative 1 (or 2 or 3) would be insignificant because the land exchange would affect less than 1% of the total acres in the Fall River West GA.

**Alternative 1:** In the short-term, alternative 1 would have the least cumulative impact to rare plant communities when combined with the effects of travel management. The removal of livestock grazing would initially benefit rare plant communities, as would implementation of the travel management decision. Under alternative 1, ranchers would not be driving on allowed routes to check their cattle, and they would not be traveling off allowed routes to fix fence or check cattle, as they are now able to do under their permit. In the long-term, the lack of disturbance under alternative 1 could negatively impact rare plant communities, potentially offsetting the benefits of travel management implementation.

**Alternative 2** would continue current trends for rare plant species and rare plant communities when combined with effects of travel management implementation. The benefits of less vehicle traffic are small and localized compared to the extent of livestock grazing impacts. Current livestock grazing management could affect some rare plant communities, and there would be fewer grazing management options available than in alternative 3.

**Alternative 3**, in combination with travel management, could improve the trend of rare plant species and rare plant communities because of the increased management flexibility. In particular, the proposed management changes in Antelope Pasture 12, Horn Pasture 40W Riparian, Warbonnet Pasture 15, and Plumb-Henry South Pasture would have beneficial cumulative effects in combination with travel management.

## Endangered, Threatened, Proposed, Candidate, Sensitive, and Management Indicator Species \_\_\_\_\_

### Endangered, Threatened, Proposed, and Candidate Species

The U.S. Fish and Wildlife Service web site was referenced in June 2011 and a list of endangered, threatened, proposed, and candidate species was obtained for Dawes and Sioux Counties, Nebraska and for Fall River County, South Dakota (see following table). Those species in the shaded rows were not carried forward for analysis because their presence or the presence of suitable habitat in the analysis area is doubtful or has not been documented. The *Biological Assessment and Evaluation for the Range Allotment Management Plan in the Fall River West and Oglala Geographic Areas* (biological assessment and evaluation) contains more information on why these species were excluded from further analysis.

**Table 3-6. Federally listed species for Dawes and Sioux Counties, Nebraska and for Fall River County, South Dakota.**

Common Name	Status	Occurs in Project Area	Habitat in Project Area
Greater sage-grouse*	Candidate	Yes, Fall River West GA	Yes
Black-footed ferret	Endangered	No	Yes
Gray wolf	Threatened	No	Yes
Whooping crane	Endangered	No	No
Ute ladies'-tresses	Threatened	No	No
Sprague's pipit	Candidate	No	No
* Greater sage-grouse is also a management indicator species (MIS) for the forest.			

## Affected Environment

In South Dakota, **greater sage-grouse** are listed as a locally uncommon permanent resident of the far west on the sagebrush prairies (Tallman et al. 2002). The only occurrence on the NNFG is in the Fall River West GA. Sagebrush shrubland is the habitat of the sage-grouse. Sagebrush is the primary food of sage-grouse during the summer and is almost the exclusive diet during winter. Almost all sage-grouse activity occurs in sagebrush or in meadows or openings adjacent to sagebrush. Because the greater sage-grouse is considered a sagebrush obligate species, the lack of sagebrush is the limiting factor for sage-grouse in the project area.

### *Existing Condition*

**Sagebrush habitat:** Sagebrush in the Fall River West GA exists in scattered patches. Some of this pattern can be attributed to location. The GA is in a transition zone and the sage naturally thins before the landscape changes to prairie. The patchiness can also be attributed to fire. Sagebrush tends to be killed by fire and since 2004, three large fires burned substantial acres in the northwest section of the GA. The patchy distribution may also be caused by past herbicide treatment. There is no documentation of the time and extent of the treatment in the Forest Service files so this activity cannot be quantified. It is believed that the spraying occurred in the 1960s when this was a common activity across the sagebrush country.

There have been two comprehensive studies of sagebrush habit on the project area: in 1992 and in 2003-2004. Both studies were conducted in the northwest section of the GA in the area the LRMP designated as MA 3.64 Special Plant and Wildlife Habitat: Sage-grouse. A comparison of the variables measured (sagebrush height, canopy coverage of grasses and forbs, percent of the area in the different canopy coverage classes) indicates the sagebrush community in MA 3.64 did not change significantly in eleven years. For a complete discussion of the studies, please see the *Biological Assessment and Evaluation* on file in the project record.

Research by Connelly and others (2000) defined optimum values for assessing sage-grouse habitat using the following habitat attributes: canopy coverage of sagebrush, height of the sagebrush, canopy coverage of grasses, canopy coverage of forbs, and height of grass-forbs during the nesting period. Using the data from the 2003-2004 study, the variables that fell below Connell's recommended optimum values were the percent of the area with 10% or

greater canopy coverage of sagebrush, the total canopy coverage of forbs, and the droop height of herbaceous vegetation.

Total canopy cover of shrubs in MA 3.64 is 6% and that occurs on less than 10% of the area. This is less than Connelly's optimum values for breeding, brood-rearing, and winter habitat show in the table below.

**Table 3-7. Canopy cover requirements and areal extent for three sage-grouse habitats types.**

Habitat type	Amount of Canopy Coverage	Over What Percent of the Total Area
Breeding	15% to 25%	80%
Brood rearing	10% to 25%	40%
Winter	10% to 30%	80%

Source: Connelly et al. 2000

Based on data collected in 2003 and 2004, the MA 3.64 portions of the Fall River West GA that emphasize sage-grouse do not have enough sagebrush to provide canopy cover for breeding, brood-rearing, and winter habitat. The sagebrush in these areas has sufficient canopy coverage, but there isn't enough sagebrush overall.

**Sage-grouse lek monitoring:** Since 1991, sage-grouse numbers in the Fall River West GA have varied from a high of 17 birds observed to a low of zero. There have been no sage-grouse observed in the GA since 2006.

Prior to 1991, there was one known sage-grouse lek in the northwest corner of the Fall River West GA. In 1991 and 1992, the South Dakota Game Fish and Parks Department and the Forest Service completed a cooperative sagebrush study and looked for additional leks in the study area. From 1993 until 1998, the established lek sites located in the 1991 and 1992 surveys were visited at least once a year. From 2000 – 2002, the leks found in the 1999 surveys were visited at least once a year. Complete surveys of the area were conducted in the spring of 2003 through 2011. Additional information is presented in the *Biological Assessment and Evaluation* on file in the project record.

**Table 3-8. Results of sage-grouse monitoring from 1991 through 2011.**

Year(s) surveyed	Lek site	Results and Observations
1991 – 1992	48GL002	No birds found.
1991 – 1992	49GL004	17 sage-grouse observed at this lek ¾ mile north of 48GL002.
1993 – 2002	49GL004	Grouse numbers varied from 14 to 2.
2003	49GL004	No birds found. 4 hens observed in the study area, not at a lek.
2004	--	No birds found in the study area during courtship and nesting seasons
2005	48GL005	One male seen displaying.
April 2006	48GL006	5 males and 3 females observed.
May 2006	48GL006	No birds found.
2007 - 2011	No leks found	No birds found.

## Environmental Consequences

Biological determinations for the endangered, threatened, and candidate species are summarized in the following table. The biological assessment and evaluation (in the project record) contains a more complete explanation of the determinations. The effects of the alternatives on greater sage-grouse are discussed in the *Direct, Indirect, and Cumulative Effects* section following the table. As mentioned previously, species in the shaded row were not carried forward in the analysis.

**Table 3-9. Summary of biological determinations for endangered, threatened, and candidate species.**

Species	Determination	
	Alternative 1	Alternatives 2 and 3
Greater sage-grouse	Viability determination is <i>No impact</i> . Population trend determination is <i>Neutral effect</i> .	Viability determination is <i>May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing</i> . Population trend determination is <i>Neutral effect</i> .
Species	Determination for Alternatives 1, 2, and 3	
Black-footed ferret, gray wolf, whooping crane, Ute ladies'-tresses, Sprague's pipit	No effect	

Grazing and its effects on the density and canopy of sagebrush is controversial, and there is little direct experimental evidence linking grazing practices to sage-grouse population levels (Connelly et al. 2004). However, grass height and cover affect sage-grouse nest site selection and success. Thus, indirect evidence suggests that if grazing (by livestock or wild herbivores) significantly reduces the herbaceous understory in breeding habitat, there may be negative impacts on sage-grouse populations (Connelly et al. 2000). Improper grazing can also facilitate invasions by exotic plants species (Connelly et al. 2004).

### ***Alternative 1 – No Action: No livestock grazing***

Removal of livestock from the area would increase cover of the herbaceous understory which should be beneficial to nesting sage-grouse. Also, removal of livestock would enable the land managers to remove fences and any infrastructure used to maintain livestock. This would eliminate the hazards to sage-grouse cause by these structures (drowning in stock tanks, colliding with fences, etc.). Finally, removal of livestock would eliminate the need for people to visit the area to check livestock which would eliminate any direct or indirect effects caused by this activity.

Even though a reduction in grazing could have positive effects on nesting cover for sage-grouse, it is doubtful a sustained sage-grouse population could live in the area without a dramatic increase in sagebrush and sagebrush cover. Sagebrush cover generally increases as utilization of the herbaceous understory increases (Crawford et al. 2004); however, sagebrush spread is a slow process, so it is doubtful any change would be detectable over the life of this project.

### ***Effects Common to Alternatives 2 and 3***

Livestock grazing could harm individual sage-grouse. Nests or young birds could be stepped on by livestock. Human activities in support of livestock grazing could have a similar effect. Vehicle tires could crush nests and young birds that cannot fly. There is also the possibility of individual sage-grouse being affected by infrastructure that is in place to manage livestock (colliding with fences, drowning in stock tanks, etc.).

#### ***Alternative 2 – No Change: No change from current grazing management***

Current livestock grazing would have little effect on sage-grouse or sage-grouse habitat in the project area. Although sage-grouse occupied the area in the past, there are no records of large populations. It is doubtful that an area on the fringe of the sage-grouse range, in marginal habitat, will have much influence on overall sage-grouse populations or status.

The cause of sage-grouse demise in the area is unknown. Given that sage-grouse were in the areas grazed by livestock for many years, it is doubtful livestock grazing is the sole cause of the current problem (although it may be a contributor).

As mentioned previously, the lack of sagebrush canopy cover is a limiting factor for sage-grouse in this area. There is some evidence that livestock grazing may be beneficial to the expansion of sagebrush by removing herbaceous understory vegetation; however this is a very slow process. A comparison of sagebrush studies from 1992 and 2004 (Hodorff 2005) shows the little change in sagebrush canopy cover in 11 years.

#### ***Alternative 3 – Proposed Action: Grazing with adaptive management practices and associated activities.***

The reduced stocking rates and improved management under this alternative could increase residual nesting and brood rearing cover which would have a positive impact on nesting sage-grouse if they return to the area. However, the limiting factor for sage-grouse in the area appears to be the amount of sagebrush canopy cover.

As discussed under alternative 2 above, livestock grazing may help sagebrush expansion, but it is unlikely that livestock grazing changes under this alternative would change sagebrush cover enough to support sage-grouse in this marginal habitat area. However, alternative 3 has other adaptive management strategies that could increase sagebrush in the area; for example, sagebrush planting from seed or seedlings, manipulation of livestock numbers and grazing patterns, and fencing. Application of these adaptive management options would provide the best chance for reestablishing sagebrush habitat for sage-grouse. Sagebrush seeding/planting would cause short-term, localized displacement of sage-grouse but sagebrush habitat for this species would improve over the long-term.

### **Forest Service Region 2 Sensitive Species**

The following table lists the Forest Service sensitive species considered in this analysis. Species in the shaded rows were not carried forward for analysis because their presence or the presence of suitable habitat in the analysis area is doubtful or has not been documented or because it is highly unlikely that land uses and allocations authorized by the Forest Service would affect the species and/or its habitat either on NFS lands or downstream. For more information about why

these species were excluded from further analysis, see the biological assessment and evaluation available in the project record.

**Table 3-10. Region 2 sensitive species considered in this analysis.**

Common Name	Occurs in Project Area	Habitat in Project Area	Preferred Habitat
Black-tailed prairie dog	Yes	Yes	Upland grasslands low structure
Hoary bat	Yes	Yes	Woody draw/riparian
Swift fox	Yes	Yes	Upland grasslands low structure
Grasshopper sparrow	Yes	Yes	Upland grasslands high structure
Short-eared owl	Yes	Yes	Upland grasslands high structure
Burrowing owl	Yes	Yes	Upland grasslands low structure
Ferruginous hawk	Yes	Yes	Upland grasslands low structure
McCown's longspur	Yes	Yes	Upland grasslands low structure
Chestnut-collared longspur	Yes	Yes	Upland grasslands low structure
Northern harrier	Yes	Yes	Upland grasslands high structure
Loggerhead shrike	Yes	Yes	Woody draw/riparian greasewood
Long-billed curlew	Yes	Yes	Upland grasslands low structure
Brewer's sparrow	Yes	Yes	Sagebrush
Northern leopard frog	Yes	Yes	Wetland/aquatic habitat
Plains leopard frog	Possible hybrid	Yes	Wetland/aquatic habitat
Plains minnow	Yes	Yes	Turbid to clear riparian/aquatic habitat
Flathead chub	Yes	Yes	Turbid riparian/ aquatic habitat
Regal fritillary	No	Yes	Upland grasslands high structure
Ottoe skipper	No	Yes	Upland grasslands high structure
Rocky Mountain bighorn sheep	Yes	Yes	Steep open terrain No proposals to allow domestic sheep grazing which would be the largest threat to the species due to the potential transmission of disease.
Black tern	Yes	Yes	Marsh/wetland habitats No alternative will negatively affect black terns' incidental use of stockdams in the area.
Bald eagle	Yes	Yes	Mature trees usually near water They occur as migrants passing through the area. There is no river-, large lake-, or reservoir-associated habitat in the project area.
Lewis's woodpecker	Yes	No	Open forests and woodlands
Townsend's big-eared bat	No	Yes	Forest/riparian
Fringed myotis	No	Yes	Forest/riparian
Mountain plover	No	Yes	Upland grasslands low structure
Yellow-billed cuckoo	No	Yes	Woody draw/riparian
American bittern	No	Yes	Large wetlands/aquatic habitat

Common Name	Occurs in Project Area	Habitat in Project Area	Preferred Habitat
Visher's buckwheat / Dakota wild buckwheat	No	Yes	Badlands
Barr's milkvetch	No	Yes	Badlands
Northern goshawk	No	No	Mature conifer forest/forest edge
Trumpeter swan	No	No	Freshwater marshes, lakes and ponds/wetland habitat
American peregrine falcon	No	No	Tall cliffs usually near water
Sturgeon chub	No	No	Turbid riparian/aquatic habitat

## Affected Environment

### *Existing Condition*

**Black-tailed prairie dog:** Prairie dogs on the forest are managed under direction in the following two decisions. These two decisions are the basis for all prairie dog management in the Fall River West and Oglala GAs.

- ♦ *Black-Tailed Prairie Dog Conservation and Management on the Nebraska National Forest and Associated Units.* Completed in 2005, this decision prescribes how prairie dogs populations will be managed in a boundary zone between national forest system land and adjoining private land.
- ♦ *Black-Tailed Prairie Dog Management on the Nebraska National Forest and Associated Units.* Completed in 2008, this decision describes management of prairie dog populations in the areas inside the boundary management zones.

The 2008 prairie dog management decision calls for a minimum of 1,000 acres and a maximum of 3,600 acres of active prairie dog colonies on the Fall River West GA. In 2012, there were 947 active acres. Under the 2008 decision, the Oglala GA is to be managed for a minimum of 1,000 acres and a maximum of 2,800 acres of active prairie dog colonies. In 2012, one of the largest colonies on the Oglala GA had a mass die-off likely due to an outbreak of plague. This is the first suspected outbreak of plague on the GA and its long-term effect on prairie dog populations is unclear. Presently, the Oglala GA has approximately 745 active acres of prairie dog colonies.

**Hoary bat:** In 2007, bat surveys were conducted on the Fall River West GA using mist nets and echolocation equipment on eight sites (Tigner 2007). No hoary bats were captured in the nets. However, hoary bats were detected using the echolocation equipment on six of the sites which indicates they are fairly common on the GA. The status of this species on the Oglala GA is currently unknown, but the species is likely to be present. During surveys in July and early August 2012, a few hoary bats were captured in mist nets over water near the Soldier Creek area of the Pine Ridge Ranger District.

**Swift fox:** Swift fox data for the Oglala GA is very limited. A few incidental sightings and road-killed swift fox have been reported, but no active dens are known on the GA although they probably exist. In 2009, Chadron State College did some track plot surveys on the GA

and had a few positive identifications and one scat sample. Swift fox surveys on the Fall River West GA were conducted as a part of a South Dakota State University graduate research project. Results are shown in the following table.

**Table 3-11. Swift fox survey results, 2008 through 2010.**

Year	Number of Captures	Number of Foxes Captured
2010	18	14
2009	30	16
2008	16	15

**Grasshopper sparrow:** Grasshopper sparrows are common in both geographic areas. They were detected regularly on all of the breeding bird survey (BBS) routes in the project area. On the Fall River West GA, the number of grasshopper sparrows has fluctuated with precipitation; in years with more precipitation, there have also been more grasshopper sparrows. On the Oglala GA, the number of grasshopper sparrows appears to be more consistent; they have not increased or decreased with increases and decreases in precipitation.

**Short-eared owl:** Fifteen short-eared owls have been seen in the Fall River West GA while completing BBS routes. On the Oglala GA, eight short-eared owls have been identified on the BBS route since it was established in 1999. This is too few to determine any trends except that they are not abundant in the area.

**Burrowing owl:** This species is common in black-tailed prairie dog colonies in both GAs.

**Ferruginous hawk:** Twenty-two different ferruginous nest sites have been identified in the Fall River West GA over the years. None were active in the spring of 2011. Historically, there have been ferruginous hawk nest sites on the Oglala GA, but at this time, there are no known active nest sites. Since the Oglala BBS route was established in 1999, only two ferruginous hawk sightings have been noted.

**McCown's longspur:** The Fall River West GA is outside the current distribution of the McCown's longspur (Dechant et al. 2003d). The most recent sighting of McCown's longspur on the Oglala GA occurred in 2011; two individuals were seen, one male and one female. The Oglala National Grassland is very close to both breeding and wintering populations of McCown's longspurs (Dechant et al. 2003d; Sedgwick 2004b).

**Chestnut-collared longspur:** Due to discrepancies in past surveys on the Fall River West GA, trend cannot be determined for this species. There is limited information available for the species on the Oglala GA; however, chestnut-collared longspurs have been infrequently counted during the Oglala BBS. Two were identified in 2002, one in 2005, one in 2008, and four in 2011.

**Northern harrier:** Fifty-two northern harriers have been seen in the Fall River West GA while completing BBS routes. They prefer high cover. The highest numbers (eight birds) occurred in 2000 and 2001 which corresponds with a few years of above-average precipitation. There were no harriers observed in 2005 and 2006 which was at the end of a drought period. Ten northern harriers have been identified on the Oglala GA during the BBS. Half of the birds identified were seen in 1999 when the OGA was coming out of several years of average or



higher growing season precipitation. The rest of the birds (one each year) were seen in 2000, 2001, 2005, 2006, and 2010.

**Loggerhead shrike:** Thirty-one loggerhead shrikes have been seen in the Fall River West GA while completing BBS routes. Forty-nine loggerhead shrikes have been identified during the Oglala BBS since 1999. They are fairly common in the greasewood habitat. There is no clear population viability trend data for this species in the project area.

**Long-billed curlew:** The long-billed curlew is a summer resident of both GAs, inhabiting short, mid, and tall grasses; wet meadows; shorelines; and prairie dog colonies (Peterson et al. 1993). Eighty long-billed curlews have been seen in the Fall River West GA while completing BBS routes. Ninety-nine long-billed curlews have been identified during the Oglala BBS since 1999. No clear population viability trends were detected over the years.

**Brewer's sparrow:** Eighty-three Brewer's sparrows have been seen in the Fall River West GA while completing BBS routes. No clear population viability trend was detected over the years. The Brewer's sparrow has never been detected during the Oglala BBS, and the current population status is unknown for the Oglala GA.

**Northern leopard frog, plains leopard frog:** The plains leopard frog has not been found on NNFG. Northern leopard frogs occur throughout the Oglala and Fall River West GAs. During a 2009 herpetological survey on Fall River Ranger District, a total of 710 amphibian species were surveyed, with 282 northern leopard frogs found (Grant 2009).

**Flathead chub, plains minnow:** At this time, the flathead chub and plains minnow are not known to occur on the Oglala GA. In 1993, flathead chubs were found in two of six sampling points along Cottonwood Creek SE of Edgemont. Plains minnows were found in one of six sampling points along Cottonwood Creek. No sampling has occurred since and it is not known if these fish still inhabit the creek. It is assumed that they do.

Approximately 1.5 miles of Cottonwood Creek are located on federal lands as it meanders through the area. The entire length is located on the Miller 514 Allotment - Winter Pasture which is currently managed as a woody draw pasture and only grazed in the winter.

**Ottoe skipper:** The Fall River West GA includes parts of Custer, Fall River, and Pennington counties. Ottoe skippers have been documented from each of those counties, and the Fall River County record appears to fall within the national grassland unit, but there are no other confirmed records from USFS lands in South Dakota (Selby 2005).

**Regal fritillary:** The Fall River West GA includes parts of Custer, Fall River, Jackson, and Pennington counties in the southwest corner of South Dakota. There are documented regal fritillary occurrences from each of these counties. Western portions of the Fall River West GA are near the western extent of the regal fritillary range. Historic records from western portions of the grassland might not represent breeding colonies, but eastern portions are well within the range and are more likely to contain breeding colonies (Selby 2007).

## Environmental Consequences

### *Summary of Biological Determinations for Sensitive Species*

Biological determinations for the sensitive species analyzed for this project are summarized in the following table. The biological assessment and evaluation (in the project record) contains a more complete explanation of the determinations. How the alternatives affect each sensitive species is discussed in the *Direct, Indirect, and Cumulative Effects* section following the table.

**Table 3-12. Summary of biological determinations for sensitive species.**

Species		Determination for Alternatives 1, 2, and 3
Black-tailed prairie dog, burrowing owl		Viability determination is <i>No impact</i> . Population trend determination is <i>Neutral effect</i> .
Swift fox, ferruginous hawk, chestnut collared longspur, loggerheaded shrike, Brewer's sparrow		May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing.
Species	Determination	
	Alternative 1	Alternatives 2 and 3
Hoary bat Plains minnow Flathead chub	No impact	May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing
Grasshopper sparrow Short-eared owl Northern harrier Northern leopard frog Plains leopard frog Regal fritillary Ottoe skipper	Beneficial impact	May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing
McCown's longspur Long-billed curlew	Likely to result in a loss of viability in planning area, in a trend to federal listing, or in a loss of species viability range wide	May adversely impact individuals but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing

### *Direct, Indirect, and Cumulative Effects – All Alternatives*

**Black-tailed prairie dog:** Two decisions, one for boundary management and one for interior management of prairie dog populations, have been made (USDA Forest Service 2005, USDA Forest Service 2008). The two decisions prescribe the acres of prairie dogs that will be maintained in each geographic area and where and when control will take place. This allotment management planning decision will not alter those decisions.

In general, alternative 1 (no livestock grazing) may make it more difficult for land managers to maintain prairie dogs in the two GAs, but it would not alter the decisions that have already

been made. Alternative 3 includes livestock grazing management aimed at expanding prairie dog colony acres in the Fall River West GA.

For the Fall River West GA, the boundary management zone is ½ mile from private land; the minimum number of active acres of prairie dogs to be maintained on the landscape is 1,000 acres and the maximum is 3,600 acres. For the Oglala GA, the boundary management zone is ½ mile from private land; the minimum number of active acres of prairie dogs to be maintained on the landscape is 1,000 acres and the maximum is 2,800 acres.

**Hoary bat:** Appropriate roosts, available surface water, and food are essential components of suitable bat habitat. Hoary bats may be susceptible to the loss of selected tree roost. Bats can be attracted to an area by increases surface area of water and will drink from stock tanks. New water tanks could actually favor expansion of hoary bat habitat if the other two components are close (Chung-MacCoubrey 1996).

Removal of livestock grazing under alternative 1 would reduce impacts to the trees hoary bats could roost in but could affect the number of water sources available for the species. Under alternatives 2 and 3, a few bats may be killed directly by livestock management activities. Livestock may browse and trample trees and shrubs that hoary bats rely on for roosting. There would be less grazing under alternative 3 compared to alternative 2. This would encourage growth of woody plants and result in better habitat for the hoary bats.

**Swift fox** are compatible with livestock grazing and in some areas, they may need livestock to reduce the vegetation height to enable them to survive in the area. Elimination of livestock grazing under alternative 1 could cause swift fox to leave the area in years where vegetation production is high. In times of high precipitation, the vegetation in the project area will grow over 30 cm which may cause swift fox to avoid the area.

Under alternatives 2 and 3, livestock grazing could result in direct mortality to an individual swift fox, but that would be a rare isolated incident. Swift fox may need livestock grazing to reduce the vegetation height to enable them to survive in the area. Compared to alternative 2, alternative 3 would have less overall grazing and more intensive management which could result in habitat conditions less favorable to swift fox. However, it is doubtful the changes would be enough to effect swift fox populations. Under alternative 3, pastures which have MA 3.64 Special Plant and Wildlife Habitat: Swift Fox Area would be grazed more intensively with a goal of providing low structure to improve or maintain swift fox habitat. This would ensure stable populations in these areas.

**Grasshopper sparrows:** Removal of livestock grazing under alternative 1 would result in an increase height and density of the herbaceous understory which should be beneficial to grasshopper sparrows. Removal of livestock would enable the land managers to remove fences and any infrastructure used to maintain livestock. This would eliminate the hazards to grasshopper sparrows caused by these structures (drowning in stock tanks, colliding with fences, etc.). Removal of livestock would also eliminate the need for people to visit the area to check livestock which would eliminate any direct or indirect effects caused by this activity.

Livestock grazing under alternatives 2 and 3 could harm individual grasshopper sparrows directly. Nests or young birds could be stepped on. The same could be true of human activities accomplished to support livestock grazing. Vehicle tires could crush nests and

young birds that cannot fly. Affected individual sparrows, however, would be a small percent of the total population, and this would not be a factor in population viability under grazing at anticipated intensities.

In alternative 3, there is a reduction of grazing in some areas and more intensive grazing management in others which would likely lead to higher plant structure and density compared to alternative 2. Grasshopper sparrows numbers in the project area have fluctuated over the years, and there is no reason to believe that this trend would not continue; it follows that the current management under alternatives 2 and 3 would not lead to a loss of viability.

Cumulatively, the loss of native prairies and grasslands for agriculture and urban development (Slater 2004) has been a pervasive impact on habitat. Intensive and extensive grazing has had negative impacts on this species, too (Bock and Webb 1984 in Vickery 1996). Hayfields can serve as habitat, but conversion of these to crop fields has had extensive impacts (Slater 2004). Government initiatives, such as the conservation reserve program, can provide habitat for grasshopper sparrows, but the loss of these efforts due to funding cuts could have a negative effect on the species.

**Short-eared owl:** The movements of livestock and the actions associated with livestock grazing and watering could harm individual short-eared owls directly. This would be especially true for young birds in nests that could be stepped on. The same could be true of human activities to support livestock grazing, such as tending windmills and building fences. Vehicle tires could crush nests and young birds that cannot fly. However affected individual owls would be a small percent of the total population, so this would not be a factor in population viability under livestock grazing prescribed by the alternatives.

Livestock grazing that is too intense for annual growing conditions could result in low structure grasslands that are not suitable for short-eared owl nesting or as habitat for the rodents they feed on.

With the removal of livestock grazing under alternative 1, there would be no livestock or ranch vehicles to occasionally destroy nests and young owls. In years of above average precipitation, high structure ground vegetation would be prevalent. Even under moderate drought, cover of intermediate height could provide nest protection. Ground litter levels could build up, and this could provide habitat for voles and other rodents that short-eared owls prey on.

Under alternatives 2 and 3, a few nests could be destroyed and young owls killed by livestock or by activities associated with managing them. During years of above average precipitation, vegetation structure could be generally favorable for this species on the more productive soils. This could be especially true in pastures with uneven livestock distribution or where only light grazing has occurred. In dry years, vegetation production may not be sufficient to produce quality habitat for short-eared owls with or without grazing. Alternative 3 would reduce the amount of grazing and contains more intense grazing management, which would produce slightly higher vegetation production and residual cover compared to alternative 2.

Cumulatively, the loss of native prairies and grasslands for agriculture and urban development has been a pervasive impact on habitat. Prairie is plowed and marshes are drained for places to grow row crops. Grazing has had negative impacts on this species when it removes nesting and foraging cover. Government initiatives, such as the conservation reserve program, can

provide habitat for short-eared owls, but the loss of these efforts due to funding cuts has a negative effect on the species.

**Burrowing owl** habitat on the Fall River West and Oglala GAs is, in essence, black-tailed prairie dog colonies. The removal of livestock grazing under alternative 1 or the management of livestock grazing under alternatives 2 and 3 would have little to no effect on burrowing owls when compared to the effects from the 2005 and 2008 management decision for the black-tailed prairie dogs.

The removal of livestock grazing may make it more difficult for land managers to maintain prairie dogs on the Fall River West and Oglala GAs, thus reducing the amount of habitat for burrowing owls. Conversely, livestock grazing management that improves conditions for prairie dog expansion creates more habitat for burrowing owls. An analysis of the effects of prairie dogs and their management on burrowing owls is presented in the EISs for the two prairie dog management decisions (USDA Forest Service 2005 and USDA Forest Service 2008).

**Ferruginous hawk:** Livestock grazing can affect ferruginous hawks in three ways: (1) changes in nest site availability, (2) effects on prey abundance, and (3) effects on prey vulnerability (Collins and Reynolds 2005). Ferruginous hawks are also extremely sensitive to disturbance during the early phases of nesting, and somewhat less so as the young near fledging.

Under alternative 1, exceptionally high, dense vegetation could develop in places in the absence of livestock grazing; this might affect some prey animals. However, the elimination of the human activity that surrounds livestock grazing would have beneficial effects to nesting ferruginous hawks.

Although there were problems with the current management (alternative 2), they were not severe enough to be the reason for the current downturn in ferruginous hawk nesting in the area. Alternative 2 has sound woody draw management in place, and there are no incidences of severe overgrazing. Alternative 3 includes some reduction in livestock numbers and more intensive management; the objective of all of the changes is to bring the area into compliance with 2001 LRMP direction.

**McCown's longspur:** Currently the only known occurrences of McCown's longspur in the project area are on the Oglala GA. Under alternative 1, elimination of grazing would reduce the available habitat in the project area. McCown's longspur breed in short grass, especially where vegetation coverage is sparse due to grazing or low soil moisture. In fact, they often prefer to breed in heavily grazed areas and may respond positively to livestock grazing.

Under alternatives 2 and 3, the movements of livestock and the actions associated with livestock grazing could harm individual McCown's longspurs. This would be especially true for young birds in nests that could be stepped on. The same could be true of human activities to support livestock grazing. Vehicle tires could crush nests and young birds that cannot fly. Affected individual longspurs would be a small percent of the total population, so this would not be a factor in population viability.

The continued livestock grazing under alternatives 2 and 3 could benefit McCown's longspur, as this species often prefers to breeds in heavily grazed areas. Higher densities of this species

were found on heavily grazed pastures, and summer-grazed areas were preferred over winter-grazed areas (Sedgwick 2004b).

**Chestnut-collared longspur:** The removal of livestock grazing under alternative 1 could result in higher and denser vegetation structure than these birds prefer.

Under alternatives 2 and 3, the movements of livestock and the actions associated with livestock grazing could harm individual chestnut-collared longspurs directly. This would be especially true for young birds in nests that could be stepped on. The same could be true of human activities to support livestock grazing. Vehicle tires could crush nests and young birds that cannot fly. Affected individual longspurs, however, would be a small percent of the total population, so this would not be a factor in population viability.

In the more mesic northern parts of its range, the chestnut-collared longspur may require moderate to heavy grazing to maintain habitat condition (Sedgwick 2004a). The levels of grazing under the current management (alternative 2) have not eliminated this bird. Under alternative 3, there is some reduction in livestock numbers and more intensive grazing management. The objective of all of the changes is to bring the area into compliance with 2001 LRMP direction (USDA 2001) which should produce adequate habitat for this bird.

**Northern harrier:** With the removal of livestock grazing under alternative 1, grass litter could build up in places which would provide good habitat for harrier nesting and brood rearing. The increase in litter could create good habitat for voles (*Microtus sp.*), potentially increasing their populations. These small rodents are a favorite prey of northern harriers.

Under alternatives 2 and 3, a few nests could be destroyed and young harriers killed by livestock or by activities associated with managing them. During years of above average precipitation, vegetation structure could be generally favorable for this species on the more productive soils. This could be especially true in pastures with uneven livestock distribution in places where only light grazing had occurred. In dry years, vegetation production may not be sufficient to produce quality habitat for northern harriers with or without grazing. Alternative 3 would reduce the amount of grazing and contains more intense grazing management, which would produce slightly higher vegetation production and residual cover compared to alternative 2.

Cumulatively, the loss of native prairies and grasslands to agriculture and urban development has been a common impact on habitat. Prairie is plowed and marshes are drained for places to grow row crops. Government initiatives, such as the Conservation Reserve Program, can provide habitat for harriers, but the loss of these efforts due to funding cuts obviously has a negative effect on the species.

**Loggerhead shrike:** The removal of livestock grazing under alternative 1 would reduce the impacts to trees and shrubs that shrikes nest in and hunt from. However, tall, dense grass could cover the area which could make hunting more difficult since shrikes prefer grass cover of moderate height.

Under alternatives 2 and 3, a few birds may be killed directly by livestock management activities. Livestock grazing and browsing may harm individual birds, their nests or habitats. There would be less grazing in alternative 3 than in alternative 2, and alternative 3 would encourage growth of woody plants and result in better habitat for the loggerhead shrike when

compared to alternative 2. For the most part, actions proposed in both alternatives are compatible with survival of this species, and, in fact, would provide adequate structure for the species.

Cumulatively, activities that destroy the prairie or even alter pastureland could be detrimental to this bird. This would include clearing shrub land and plowing prairies and pastures supporting shrubs to plant row crops. Construction activities and fragmentation of the prairie for such projects as highway construction could hurt populations of this bird.

**Long-billed curlew:** Removal of livestock grazing under alternative 1 would eliminate the chance of mortality from livestock trampling or collisions with vehicles during livestock management activities. However, no grazing would leave high/dense grass cover, obstructing the vision of curlews and hiding predators, making the birds more susceptible to predation.

Under alternatives 2 and 3, certain livestock management activities, such as driving vehicles to care for stock or maintain improvements, might pose a hazard to these birds and could cause isolated mortality. In general, the long-billed curlew prefers areas with short vegetation. Alternative 2 allows the most grazing, which would result in the most habitat for the long-billed curlew. Alternative 3 has a slightly lower stocking rate than alternative 2 which could result in less desirable habitat

Cumulatively, destruction or fragmentation of the prairie by plowing or development would be detrimental to these birds.

**Brewer's sparrow:** With the removal of livestock grazing under alternative 1, there would be no livestock or ranch vehicles to occasionally destroy nests and young sparrows. Removal of livestock would also enable the land managers to remove fences and any infrastructure used to maintain livestock. This would eliminate the hazards to Brewer's sparrows cause by these structures (drowning in stock tanks, etc.). Sagebrush cover generally increases as utilization of the herbaceous understory increases (Crawford et al. 2004). Because the cover of sagebrush is a limiting factor for Brewer's sparrows in the area, elimination of grazing may inhibit the spread of sagebrush and could actually facilitate some die-off of sagebrush considering that the project area is on the western edge of the sagebrush habitat type.

Under alternatives 2 and 3, the movements of livestock and the actions associated with livestock grazing could harm individual Brewer's sparrows. This would be especially true for young birds in nests that could be stepped on. The same could be true of human activities to support livestock grazing. Vehicle tires could crush nests and young birds that cannot fly. Affected individual sparrows, however, would be a small percent of the total population, so this would not be a factor in population viability under grazing prescribed by the alternatives.

Some level of grazing may be beneficial to Brewer's sparrows because it may promote the expansion of sagebrush. Under alternative 3, the reduced stocking rates and improved management strategies could affect the spread of sagebrush. However, the future option of sagebrush seeding or planting would improve habitat for Brewer's sparrow if successful. There would be localized, short-term displacement to Brewer's sparrows during seeding/planting activities.

**Northern leopard frog, plains leopard frog:** Livestock hooves trample leopard frogs, especially when adult frogs are foraging in uplands. Livestock also trample all life stages of

this species in aquatic habitats. Vehicle tires smash frogs on trails and roads. Erosion results in sediments that could smother leopard frog eggs in wetlands.

Leopard frog habitat would improve under alternative 1 with the removal of livestock impacts and human activities associated with livestock management. The direct/indirect effects described above would also be removed.

Under alternatives 2 and 3, some frogs could be killed by livestock hooves or by vehicles being driven by people who are managing livestock. Indirectly, livestock trampling could produce sediments that would smother frog eggs in some locations. However, these impacts would not be severe enough to adversely affect all leopard frogs in the project area. Attaining or approaching LRMP objectives for high structure vegetation would provide better protection of the aquatic habitat.

Cumulatively, stocked fish depredate leopard frogs. Human movements in wetland environments introduce diseases harmful to leopard frogs, such as chytridionmyhcosis and ranavirus (Smith and Keinath 2007). Pesticides, excess fertilizers, metals, acids, fish poisons, PCBs, arsenic, and sediments could also kill leopard frogs when these substances enter aquatic habitats (Smith and Keinath 2007). A wide variety of developments that fragment or destroy wetlands would harm this species.

**Flathead chub, plains minnow:** Cattle could step on a flathead chub/plains minnow or step on eggs while crossing the stream. People crossing the creek while tending to livestock could have the same effect. Overgrazing by livestock is another potential threat.

Under alternative 1, the removal of livestock would remove impacts to streambanks and riparian vegetation, and flathead chub/plains minnow habitat would improve in response.

The effects of implementing alternative 2 would be minimal. Cottonwood Creek is the only place in the project area where the flathead chub/plains minnow is found. The stretch of Cottonwood Creek affected by this decision is moderately stocked by livestock and only grazed in the winter.

Alternative 3 would result in a slightly better situation for the flathead chub/plains minnow when compared to alternative 2. Initially there is no plan to change the management of the area through which Cottonwood Creek flows. If monitoring reveals a need to change management to favor these fish, adaptive changes could be made under alternative 3.

**Ottoe skipper:** There is a chance that Ottoe skippers or their larvae could be trampled by livestock or run over by vehicles used to manage livestock grazing. Grazing has been identified primary disturbance to Ottoe skippers and they tend to be absent from grazed prairies in North Dakota (Selby 2005). Light grazing may not be a threat to the long-term survival of prairie-specialist butterflies, especially if there is some contiguous ungrazed habitat, but heavy grazing is a threat (Selby 2005). Reduced availability of nectar resources is likely the primary factor, but changes to vegetation structure, removal of larval host plants, and trampling eggs and larvae may also be factors (Selby 2005).

Under alternative 1, there would be no livestock grazing so there would be no direct mortality. In general, Ottoe skipper numbers tend to be reduced or absent in grazed areas (Selby 2005). No grazing should result in optimum habitat at least initially.



Under alternatives 2 and 3, there is a chance that Ottoe skippers or their larvae could be trampled by livestock or run over by vehicles used to manage livestock grazing. In general, Ottoe skipper numbers tend to be reduced or absent in grazed areas (Selby 2005). There is a slight reduction in AUMs in alternative 3 compared to alternative 2. This reduction in grazing could be beneficial to the Ottoe skipper, but it is doubtful that this slight reduction would result in any measurable differences in Ottoe skipper populations between the two alternatives.

Cumulatively, historic loss, degradation, and fragmentation of the prairie landscape have been the primary factors contributing to the decline and current vulnerability of Ottoe skipper populations, and continued habitat loss, degradation, and fragmentation are the greatest potential threats to future populations. Activities that threaten further habitat loss include row crop agriculture, urban development and housing construction, road construction and maintenance, gravel mining, and wind generators. Threats to habitat quality and the availability of critical resources (e.g., nectar plants, larval food plants) include indiscriminant use of herbicides, invasive exotic species, and encroachment by woody vegetation (native and exotic). Fire, grazing, and haying can play important roles in maintaining and shaping prairie ecosystems, so the complete absence of these processes could constitute a threat to the extent and quality of prairie remnants. However, they could also pose direct and indirect threats to Ottoe skippers depending on their timing and intensity. Larvae are extremely vulnerable to direct mortality from fires when they are using aboveground shelters, and improperly timed fires, grazing, and haying could impact the availability of nectar and larval food resources at critical times. Other more direct threats to Ottoe skippers can include extreme weather (e.g., harsh winters, late frosts, unusually cool and wet growing seasons, and severe storms), indiscriminant use of insecticides, disease, and predation. A reduction in fitness resulting from genetic isolation may also pose a long-term threat (Selby 2005).

**Regal fritillary:** There is a chance regal fritillary butterflies or their larvae could be trampled by livestock or run over by vehicles used to manage livestock grazing. In general, regal fritillary butterfly numbers tend to be reduced in direct proportion to increasing grazing intensity (Selby 2007).

Under alternative 1, there would be no livestock grazing so there would be no direct mortality. In general, regal fritillary butterfly numbers tend to be reduced in direct proportion to increasing grazing intensity (Selby 2007). No grazing should result in optimum habitat at least initially.

Under alternatives 2 and 3, there is a chance that regal fritillary butterflies or their larvae could be trampled by livestock or run over by vehicles used to manage livestock grazing. In general, regal fritillary butterfly numbers tend to be reduced in direct proportion to increasing grazing intensity (Selby 2007). There is a slight reduction in AUMs in alternative 3 compared to alternative 2 and more flexibility in make changes should monitoring indicate that the regal fritillary butterfly is being negatively impacted by current grazing strategies.

Cumulatively, the loss of native prairies and grasslands to agriculture and urban development has been a common impact on habitat. Spread of exotic species can have an effect the habitat of the butterfly as the exotic plant species out competed the native vegetation that is important to the survival of the butterfly. Pesticides have an obvious effect on the butterflies. Prescribed and wild fire could affect the regal fritillary butterfly. Fire can benefit these butterflies by

helping to control habitat loss to cool-season exotics and woody vegetation, increasing the vigor of native species (including larval food plants), and increasing flowering rates of important nectar sources. However, to reap these benefits, the butterflies must either survive the fire or recolonize burned areas from an adjacent source. Fires that are overly extensive (e.g., burning all or most of the regal fritillary habitat at one time) or frequent fires (e.g., every one to two years) would negatively affect regal fritillary populations (Selby 2007).

## Management Indicator Species (MIS)

The sharp-tailed grouse is an MIS for the Oglala GA. LRMP objectives for this species in the Oglala GA include:

- ◆ Over the life of the plan provide diverse and quality grassland habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sharp-tailed grouse and other wildlife with similar habitat needs.
- ◆ Establish and maintain quality nesting and brooding habitat for sharp-tailed grouse (See LRMP appendix H) and associated wildlife by meeting vegetation objectives for high structure within ten years.
- ◆ Establish and maintain quality foraging habitat for sharp-tailed grouse and associated wildlife species by enhancing and /or maintaining a diversity of forb species in grassland communities and regeneration of shrub patches and the shrub component of wooded draws and riparian habitats.

Forest plan guidance is to have 10-30% of the Oglala GA in high vegetation structure in order to provide adequate nesting cover in areas that can support such vegetation especially in the proximity of known sharp-tailed grouse display grounds and important foraging and cover areas (i.e. shrub habitats, private croplands).

## Affected Environment

Based on monitoring data, the Oglala GA does not meet LRMP guidance during times of drought, but possibly could during years when the GA receives average and higher amounts of precipitation during the growing season. Sharp-tailed grouse peaked in 2000 then sharply declined shortly after the drought began (early 2000s). Since 2008, there has been a slow but steady increase in the total number of grouse counted on leks in the spring; 2008 is approximately when the drought ended. Over the past fifteen years, the abundance of sharp-tailed grouse counted on the leks in the spring appears to be more closely correlated to precipitation than habitat management through the use of grazing. Since 2008, the annual growing season precipitation has been at or above average.

## Environmental Consequences

### *Alternative 1 – No Action: No livestock grazing*

In the no grazing alternative (alternative 1), the GA would have the maximum amount of high structure vegetation at least initially. This alternative would provide the most nesting cover for sharp-tailed grouse of the three alternatives. With time, however, both the structure and the seral stage would decline somewhat, as productivity declines due to lack of nutrient and

mineral cycling and through shading by grass litter. However, the grass structure would still be higher than under the other alternatives, especially during low-precipitation periods.

The biological determination for the sharp-tailed grouse in alternative 1 is a positive impact on the population trend of the species in the project area. Although the Oglala GA exists on the periphery of this species range, the total impact of having no grazing across the entire project area would increase available nesting and foraging habitat and escape cover from predators. Also, removal of livestock would enable the land managers to remove fences and any infrastructure used to maintain livestock. This would eliminate the hazards to sharp-tailed grouse caused by these structures (drowning in stock tanks, colliding with fences, etc.). Finally, the removal of livestock would eliminate the need for people to visit the area to check livestock. This would eliminate any direct or indirect effects caused by this activity.

### ***Alternative 2 – No Change: No change from current grazing management***

Based on lek count information, sharp-tailed grouse population trend on the Oglala GA appears to be neutral to slightly positive under existing management. The trend line includes data going back to 1993 when no grouse were counted on leks on the GA.

The biological determination for the sharp-tailed grouse in alternative 2 is a neutral impact on the population trend of the species in the project area. Under this alternative, livestock management would continue under the existing practices and existing sharp-tailed grouse populations on the Oglala GA would be more likely driven by weather events than by habitat management through cattle grazing. Even during periods of prolonged drought where grouse populations on the GA may drastically decline, the grouse population trend would only be affected nominally.

### ***Alternative 3 – Proposed Action: Grazing with adaptive management practices and associated activities***

Under the proposed action, there should be more nesting and foraging habitat available for the sharp-tailed grouse than under alternative 2 because of the of the proposed grazing changes and the additional flexibility allowed to the rangeland managers to make changes as needed to meet GA desired conditions. Although the proposed action may be slightly more beneficial to sharp-tailed grouse than alternative 2, there is no difference in the allowed AUMs on the Oglala GA between the two alternatives. During times of drought, the Oglala GA may still not meet LRMP direction. Additional monitoring would be required if alternative 3 is selected to see if it is effective during times of drought.

The biological determination for the sharp-tailed grouse in alternative 3 is a neutral impact on the population trend of the species in the project area. Under this alternative, livestock grazing would continue under adaptive management practices. There is no reduction in AUMs between alternatives 2 and 3, but the adaptive management should provide slightly more nesting and foraging habitat for sharp-tailed grouse than alternative 2. The differences between the two action alternatives are nominal, and the population trend for sharp-tailed grouse in the Oglala GA is unlikely to be affected by the proposed changes.

### ***Cumulative effects from all alternatives***

Other activities occurring or that have occurred on or near the Oglala GA include the Sand Creek land exchange, travel management implementation, prairie dog control, fossil theft, and regulated hunting. Cumulatively, the effects of all the identified actions in combination with any of the alternatives would be rather insignificant to the population trend of sharp-tailed grouse across its current geographic range based on the scope and duration of the identified activities. Of the identified actions, regulated hunting would have the greatest impact on the population trend of the species, but it is currently not considered a threat to the survival of the species and the sharp-tailed grouse hunting season in Nebraska has recently been expanded. Of the proposed alternatives, the no grazing alternative (alternative 1) would be most beneficial to sharp-tailed grouse, but none of the alternatives are expected to negatively affect the population trend of the species across its geographic range. All alternatives are expected to have a *neutral impact* on the population trend of sharp-tailed grouse.

## **Climate Change**

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### **Affected Environment**

There are two issues to be considered when determining if there is a cause-effect relationship between public land livestock grazing in the project area and climate change: methane gas production and environmental stress on the land in the project area.

**Methane gas production:** Globally, ruminant livestock produce about 80 million tons of methane annually, accounting for about 22% of global methane emissions from human-related activities. In the U.S., cattle emit about six million metric tons of methane per year into the atmosphere. The contribution of methane from permitted cattle in the project area is 0.005% to 0.008% of the national output of cattle methane in the U.S.

**Environmental stress on the land:** Late and late intermediate seral stage rangelands are better able to withstand climatic changes such as drought. They have a diversity of shallow, medium and deep-rooted perennial grasses along with a variety of forbs and a few shrubs. Very little, if any, bare ground is present; soils are stable with little to no wind or water erosion. Seventy-eight percent of the rangelands within the project area are in the late and late intermediate seral stage, 20% falls within early intermediate, and the remaining 2% is in early seral stage.

### **Environmental Consequences**

The impact of greenhouse gases from most Forest Service projects is extremely small in the global climate context, and objective standards or thresholds do not exist yet with which to draw conclusions about the significance of the results. Therefore, considering climate change impacts (greenhouse gases sequestered and emitted) in a qualitative discussion may be most appropriate.

Given the lack of federal standards related to greenhouse gas emissions, any data and conclusions developed through quantitative analysis methods would normally only be used for the comparison of alternatives. Without sufficient scientific understanding to draw conclusions

about the significance of the quantitative results it may not be meaningful to disclose more than this (USDA Forest Service 2008).

### ***Alternative 1 – No Action: No livestock grazing***

**Direct, indirect, and cumulative effects:** Removal of livestock grazing from the project area would not result in direct greenhouse gas emissions or direct changes in climate or overall vegetation patterns. Permitted livestock numbers would be removed from federal lands and still exist on other lands unless the rancher was forced out of business. Carbon would remain sequestered in the forested and grassland portions of the project area. Methane would not be produced by livestock on those portions of the project area on Forest Service land. This reduction in methane production would not be measurable. As discussed above, it is likely that permitted livestock grazing on any one national forest in the United States contributes much less than 1% of the methane production to the national annual output; a removal of livestock from these seventy-six allotments in the project area would then not appreciably change this predicted output.

### ***Alternatives 2 and 3***

**Direct, indirect, and cumulative effects:** Alternatives 2 and 3 would authorize livestock grazing in the project area, and this would result in the production of the greenhouse gas, methane, by permitted livestock. However, this project-level contribution to greenhouse gas emissions would not be significant enough to measure.

The adaptive management strategies under alternative 3 are key components in being responsive to climate change effects and should be incorporated into the proposed action of all allotment management plans. Adaptive management practices will result in healthy rangeland ecosystems that will be better able to store more carbon and transition naturally with any potential climate change effects over the very long-term.

## **Water Quality and Soil Resources**

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### **Affected Environment**

The project area is located in portions of two watersheds. Approximately 89% of the project area is in the Cheyenne River watershed, and 11% is in the White River watershed. Riparian and woody draw monitoring in the project area shows that Antelope, Hat, Indian, Long Branch, Sand, Little Cottonwood, and Whitehead creeks are intermittent. Squaw Creek, Big Cottonwood Creek, North Draw, and Lone Tree are ephemeral.

The project area is located within the NRCS's Pierre Shale Plains Major Land Resource Area (MLRA). The dominant soil orders are Entisols, Alfisols, Vertisols, and Inceptisols. They are shallow to very deep, generally well drained, and clayey. (USDA, 2006; Reyher, Deanna, 2012; USDA, 2010)

Only two hydric soil types are present: Hoven Silty Loam (Ho) and Aquolls Nearly Level (Ap). Both are located in the Fall River West GA portion of the project area. They comprise

approximately 44 acres spread over three sites. This equates to 0.04% of the Fall River West GA.

### ***Existing Condition***

The 305(b) water quality assessment prepared by the South Dakota Department of Environment and Natural Resources (DENR) divides the Cheyenne River into six segments. The project area has the potential to directly and/or indirectly affect three segments: the Cheyenne River from Beaver Creek to Cascade Creek, the Cheyenne River from Cascade Creek to Angostura Reservoir, and Angostura Reservoir. In addition, the DENR also monitors Hat Creek which runs through portions of the project area and empties into the Cheyenne River segment from Beaver Creek to Cascade Creek (2010).

The South Dakota 305(b) *Water Quality Assessment* reports that the “Cheyenne River water quality continues to be poor due to natural and agricultural sources” (South Dakota DENR 2012). Hat Creek was listed as impaired in 2006 and 2008 for specific conductance. The 2012 report shows Hat Creek as fully supporting its beneficial uses with the exception of limited contact recreation for which there is insufficient data to make a determination. Monitoring of Angostura Reservoir found that it met all designated beneficial uses.

The project area also has the potential to affect a portion of the White River/Hat Creek basin in Nebraska. This basin covers 2,130 square miles in northwestern Nebraska. Most of the project area is located in ephemeral drainages on the uplands.

For the last 20 years, the Buffalo Gap and Oglala National Grassland personnel have conducted vegetation inventory surveys utilizing the Natural Resource Conservation Service doubling sampling methodology. The current range condition of the federal land is generally estimated to be good to very good as indicated by the following table. In general, infiltration increases and runoff and erosion decrease with improvement of the range condition (Food and Agriculture Organization of the United Nations, no date).

**Table 3-13. Range condition class/seral stage in the project area.**

<b>Seral Stage/Range Condition Class</b>	<b>Fall River West GA*</b>	<b>Oglala GA*</b>	<b>Total Project Area**</b>
Late/Excellent	15%	28%	21%
Late Intermediate/Good	64%	45%	56%
Early Intermediate/Fair	17%	24%	20%
Early/Poor	4%	1%	3%

\* Discrepancies are due to rounding      \*\* Weighted by acreage

### ***Desired Condition***

The desired condition for water quality in the project area is to meet relevant direction in the Clean Water Act and the LRMP. This includes managing activities to maintain ground cover which, in turn, reduces runoff, erosion, and sedimentation.

There is no monitoring data available on the condition of the hydric soils in the project area. These are known as closed depressions, which are similar to small playas. The desired

condition for these areas is to maintain or improve them. To accomplish this, they would be fenced to protect the habitat from livestock grazing.

## Environmental Consequences

### *Alternative 1 – No Action: No livestock grazing*

**Direct and indirect effects:** Under this alternative, excluding livestock grazing could improve water quality by accomplishing the following:

- ◆ Preventing livestock from being in water resulting in reduced impacts to streambanks and manure deposition in water.
- ◆ Reducing soil compaction.
- ◆ Increasing vegetation and undergrowth.
- ◆ Increasing soil permeability which may reduce erosion and sediment transportation (EPA, 2003).
- ◆ Increasing in total standing cover and ground mulch (Smeins 1975).

The current range condition of the federal land is generally estimated to be good to very good. This, combined with the fact that most of the project area is located in ephemeral drainages on the uplands, means any increase in water quality may be negligible. Water yield, in the form of runoff, could decrease. Literature has shown that runoff is greater at moderate stocking rates compared to no grazing, with little difference in rates of erosion (Food and Agriculture Organization of the United Nations, no date).

Permanent removal of grazing may not guarantee increased annual herbaceous plant production. Research on a Kentucky bluegrass meadow found that full protection resulted in peak production by the 6<sup>th</sup> year, followed by declining production until it was similar to a season-long grazed pasture. Accumulation of litter over time, though providing ground protection, seems to retard production in riparian areas. Some grazing could have beneficial effects (University of California Cooperative Extension, no date).

**Cumulative effects:** The reduction in the number of grazing animals in combination with the increased vegetation density and root mass should reduce any likelihood of bacterial contamination of water from the federal land. This assumes that wildlife numbers will not significantly increase, which could actually increase the probability of bacterial contamination (USDA Forest Service 2000, Buckhouse et al. 1976).

Any assumed stabilization provided by this alternative would only be attained on the federal lands affected by this decision. There is no guarantee that this alternative would correct current impairments of the Cheyenne and/or White Rivers. Most of the federal land is located on the uplands and does not directly affect the river system. Private lands intermingled within the federal pastures would most likely be fenced by their owners for continued use. This shift in use could nullify any water quality gains attributable to the federal lands if the private lands are not capable of supporting the increased grazing pressure.

### ***Effects Common to Alternatives 2 and 3***

**Direct and indirect effects:** There is no indication that management of the allotments is contributing to the degradation of the water quality of the Angostura Reservoir because the South Dakota 305(b) report states that Angostura Reservoir is fully supporting its designated beneficial uses (South Dakota Department of Environment and Natural Resources 2010). The same is true for Hat Creek.

Most of the project area is located in ephemeral drainages on the uplands which means impacts to water quality are likely negligible.

#### ***Alternative 2 – No Change: No change from current grazing management***

**Direct and Indirect Effects:** Nine pastures have currently been identified as overstocked. However, current data on total cover, bare ground, litter, and range condition indicate that the federal lands should not be contributing to sedimentation in the Cheyenne River watershed. The woody draw/ riparian pastures currently being affected (on the Oglala GA) will continue on a downward trend which could affect water quality of the Hat Creek and add to the impairment of the Cheyenne River segment from Beaver Creek to Cascade Creek.

The state of Nebraska lists three waterbodies as impaired: Meng Lake, Boardgate Pond and Agate Pond. Since total maximum daily loads (TMDLs) have not been established for these waterbodies, it cannot be certain whether or not management is a factor in the impairment. The impaired waterbodies are located in the White River and Hat Creek watersheds which have been determined to be fully supporting beneficial uses.

There is no current known impairment of the monitored watersheds/lakes within the project area due to coliform. Construction of range improvements could result in short-term increases in sedimentation if the improvements were constructed close to a stream and if the soils were erodible.

The hydric soil (closed depression) areas in the Cottonwood Group, Simons, and Fuchs allotments could contribute to water quality problems due to disturbance from grazing animals during wet conditions. This is a very small possibility since these areas amount to only 0.04% of the Fall River West GA.

**Cumulative effects:** Overstocking in some pastures, combined with the presence of prairie dog colonies, has the potential to contribute sediment and add to the impairment of the Beaver Creek to Cascade Creek portion of the Cheyenne River drainage.

#### ***Alternative 3 – Proposed Action: Grazing with adaptive management practices and associated activities***

**Direct and indirect effects:** Allotments/pastures that are currently overstocked would have stocking reduced to recommended levels. Areas designated for prairie dog management would have stocking remain at current levels or increased to promote prairie dog expansion. In the Fall River West GA, nine allotments would have stocking rates reduced and in another nine allotments, pastures would have stocking rates reduced through livestock grazing rotations. In five pastures, stocking would increase to help expand prairie dog colonies.



The future option of sagebrush seeding or planting would not affect water quality or soil resources in seven Fall River West GA allotments. Seeding would be done using broadcast methods (most likely aerial) or drilling. With drilling, the drill depth needed is only 1/16 of an inch so sedimentation is not likely to be a concern (Lambert, 2005; Shaw et al, 2005). Planting individual sagebrush plants would result in small non-continuous disturbances which would not be a concern for sedimentation or water quality.

Average ground cover and litter data indicates that water quality could be maintained. Those areas of poor cover and low litter would improve due to changes in stocking rates.

Woody draw pasture management on the Fall River West GA would remain the same; adjustments in management of three of the Oglala GA riparian pastures would stabilize or reverse downward trend.

There is no current known impairment of the monitored watersheds/lakes within the project area due to coliform.

Alternative 3 includes a design feature (fencing) to protect the three areas which have hydric soils; these areas would not be a contributing factor to water quality since they would be fenced to exclude livestock grazing.

**Cumulative effects:** Decreased sedimentation is expected in the eighteen pastures in the Fall River West GA scheduled for reduced stocking. The eleven Fall River West GA pastures with an increase in stocking could cause increased sedimentation.

## Cultural Resources

### Affected Environment

Current evidence of cultural activity in the analysis area reflects at least 12,000 years of continuous human occupation and the potential for past human activity spans the entire chronological sequence of the Great Plains culture area (Prentiss and Rosenberg 1996). There are no documented traditional cultural properties (TCPs) in the area of potential effects (APE) and formal consultation with Indian tribes known to have occupied the analysis area was conducted during the scoping for the project.

**Table 3-14 Approximate chronology for the project area.**

Cultural Tradition	Time Period
Paleoindian	12,000 – 7000 BP
Archaic	7000 – 2000 BP
Woodland	2000 – 1000 BP
Protohistoric	AD 1550 –1750
Historic	AD 1750 – 1950

### Existing Condition

A forest records search was conducted and all previous surveys and cultural resource sites were reviewed within the APE. Forest heritage program files maintained at the Supervisor's

Office in Chadron, Nebraska, and the online Archaeological Resources Management System for the South Dakota State Historical Society Archaeological Research Center were examined.

In Nebraska, thirty-one previous inventories have been conducted within the analysis area. Of this number, one previous survey (UNL/Wandsnider) does not have SHPO concurrence. A total of 169 cultural resource sites were previously recorded within the analysis area. Of the 169 cultural resources examined, thirteen are considered eligible, fifty-three are not eligible, and 103 are unevaluated to the NRHP.

In South Dakota, ninety-six previous inventories have been conducted within the analysis area. A total of eighty-seven cultural resource sites were previously recorded within the analysis area. Of the eighty-seven cultural resources examined, five are considered eligible, thirty-one are not eligible, and forty-five are unevaluated to the NRHP.

With the exceptions described above, cultural resource surveys have not been completed in those areas in which ground-disturbing activities have been proposed in all project alternatives. Once these activities and their specific locations are identified, they will be subject to the regular Section 106 process, as identified in 36 CFR 800 (SD SHPO concurrence May 6, 2013; NE SHPO concurrence May 29, 2013). The activities are defined as undertakings under 36 CFR 800.16(y) and can include, but are not limited to, the activities listed below:

- ♦ Increase stocking rate (AUMs) livestock numbers or duration within a given allotment.
- ♦ Repair or construct a fence to create riparian unit.
- ♦ Repair or construct a fence to exclude livestock from areas of concern.
- ♦ Repair or construct standard barbed wire fence and/or temporary or permanent electric fence.
- ♦ Control livestock distribution patterns by constructing and/or removing cross fences.
- ♦ Repair or construct livestock water development (pipelines, tanks, windmills, wells, stock dams, submersible pump, solar).
- ♦ Remove or relocate existing developments (fence, pipeline, tanks, windmill, well, stock dam).
- ♦ Rehabilitate areas seeded to introduced grass species back to native grass, shrub, and forb species.
- ♦ Seed or plant sagebrush (various methods).
- ♦ Use of salt or supplement to draw livestock toward or away from specific areas. This applies to allotments or pastures where salt or supplements have not been used in the past.

### ***Desired Condition***

The present condition of heritage resources on the forest is on course with the desired condition described in chapter 1 of the LRMP.

## Environmental Consequences

### *Alternative 1 – No Action: No livestock grazing*

**Direct and indirect effects:** Under this alternative, there would be no livestock in the project area. Since no new ground-disturbing activities would take place, cultural resource sites would remain in their current condition.

**Cumulative effects:** The absence of livestock grazing, no new structural range improvements, and no new travel by permittees would be a beneficial impact to cultural resources. However, the cumulative effects from past disturbances, including off-road and administrative vehicle use, recreational use, and the natural erosion process would still potentially affect cultural resources.

### *Alternatives 2 and 3*

**Direct and indirect effects:** Livestock grazing under alternatives 2 and 3 has the potential to adversely impact significant heritage resources through trampling, obliteration, or displacement. Sites located near livestock congregation areas (water tanks, salt licks, gates, along fence lines, other livestock trails) suffer the most damage. The severity of livestock grazing impacts to heritage resources increases proportionately with the number of livestock and duration of livestock congregation.

Livestock grazing requires the construction and maintenance of range improvements including water tanks, pipelines, fences, and access roads. The installation and maintenance of range improvements typically requires new ground disturbance. Projects requiring new ground disturbance, by definition, have the potential to adversely affect significant heritage resources. Additional indirect effects of livestock grazing include increased visibility of heritage resources caused by erosion and exposure, which can lead to increased vandalism of sites by the public.

**Cumulative effects:** Maintenance activities, cattle trailing, and cattle congregating around stock tanks and salt licks combined with the effects from past disturbances, including off-road and administrative vehicle use, and recreational use, would have an adverse cumulative effect on historic properties.

## Paleontological Resources

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### Affected Environment

Within the units administered by the NNFG, the geologic and paleontologic records spans a relatively short time. The oldest exposed unit, in the Late Cretaceous Mowry Formation, is located on the Fall River Ranger District (western half of the Buffalo Gap National Grassland). The youngest unit, in Pleistocene deposits, is located on the Oglala National Grassland. The Hudson-Meng Research and Education Center is in the Pleistocene deposits on the Oglala GA.

The 2001 LRMP established five paleontological special interest areas (SIAs). Four are located on the Fall River Ranger District, Buffalo Gap National Grassland and the fifth is located on the Pine Ridge Ranger District, Oglala National Grassland.

### ***Existing Condition***

During 1991-1995, South Dakota School of Mines and Technology conducted paleontological inventories. Many vertebrate fossil localities were documented many with evidence of fossil theft.

During 1991-1995, University of Nebraska-Lincoln completed a total of twenty-five weeks of pedestrian paleontological resource inventories on the Oglala National Grassland, a total of 86,570 acres of the grassland were inventoried. Forty percent of the area surveyed showed physical evidence of illegal collecting in the form of shallow pits, abandoned tools and equipment, and exposed fossils marked with signal flags, signal tape, or rock cairns. They observed that 88% of the illegal collecting activity recorded in 1991 involved fossils from the Chadron Formation, which weathered into low, flat topographic features and was easily accessible by foot or motor vehicle.

### ***Desired Condition***

The desired conditions for paleontological resources are described in the 2001 LRMP as follows:

1. Protect key paleontological resources (Classes 3, 4, and 5 of the Fossil Potential Classification in Appendix J) from disturbance, or mitigate the effects of disturbance, to conserve scientific, interpretive, and legacy values. (Appendix J). Standard
2. Survey and post federal land boundaries where paleontological sites have Fossil Potential Classification sensitivity rankings of 3, 4, or 5. (See Appendix J for details). Guideline
3. Prior to ground-disturbing activities, conduct paleontologic surveys in any area where there is a high potential to encounter these resources according to the process outlined in Appendix J. Standard

## **Environmental Consequences**

### ***Alternative 1 – No Action: No livestock grazing***

**Direct and indirect effects:** Under this alternative, there would be no livestock in the project area. Since no new ground-disturbing activities would take place, paleontological resource sites would remain in their current condition.

**Cumulative effects:** With no livestock grazing and the removal of range improvements, there would be a beneficial impact to fossil resources. However, this beneficial impact would not be enough to offset the adverse impacts of erosion and fossil damage caused by past cattle trailing and congregating around stock tanks and salt licks and the damage from vandalism and theft.

## ***Alternatives 2 and 3***

**Direct and indirect effects:** Livestock grazing has the potential to adversely impact significant paleontological resources through trampling, obliteration, or displacement. Sites located in livestock congregation areas, such as near water tanks, salt licks, gates or along fence lines or other livestock trails, suffer the most damage. The severity of grazing impacts to paleontological resources increases proportionately with the number of livestock and the duration of livestock congregation. Most of the impacts occur in the Wallace Ranch Paleontological SIA, where cattle travel across the bare outcrops. Alternative 3 contains design criteria to protect the Wallace Ranch and Toadstool SIAs by fencing cattle out (see chapter 2, design criteria table, criterion #9). These proposed fences are shown on the relevant maps in Appendix B.

Livestock grazing requires the construction and maintenance of range improvements including water tanks, pipelines, fences, and access roads. The installation and maintenance of range improvements typically requires new ground disturbance. Projects requiring new ground disturbance, by definition, have the potential to adversely affect paleontological resources. Additional indirect effects of livestock grazing include increased visibility of paleontological resources caused by erosion and exposure, which can in turn lead to increased vandalism of sites by the public.

**Cumulative effects:** The effects caused by maintenance activities, cattle trailing, and cattle congregating around stock tanks and salt licks, combined with the present fossil vandalism and thievery could have a cumulative adverse effect on paleontological resources.

## **Recreation Resources**

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### **Affected Environment**

#### ***Existing Condition***

There is one developed campground, Toadstool, with a site capacity of fifty-eight and an average occupancy of 52%. The Hudson-Meng Research and Education Center is the site of one of the most important Paleo-Indian archaeological discoveries in North America and is a popular destination with a visitor center and interpretive tours. Dispersed recreation activities in the area include camping, picnicking, hiking, upland game bird hunting, big game hunting, prairie dog shooting, horseback riding, fishing and off-highway vehicle use. The 2011 National Visitor Use monitoring results indicate that people visiting the NNFG favor nature-based types of activities. Viewing scenery and wildlife are popular activities, as is driving for pleasure. The primary activities are fishing and hunting. Recreation use across the project area is light. There are very few instances of crowding or heavy use with the possible exception of hunting seasons. There is one five-year, recreation event special use permit issued in the area which permits a motorcycle endurance ride on the Oglala GA.

The scenic integrity objective (SIO) of the project area is predominantly low (see following table) which refers to landscapes where the valued landscape character appears moderately altered. Twenty percent of the project area has an SIO of moderate which refers to landscapes

where the valued landscape character appears slightly altered. The special interest areas (SIAs) in the project area (2%) have a high SIO which refers to landscapes where the valued landscape character is intact with only minute, if any, deviations.

**Table 3-15. Acres and percent of each geographic area in the SIO areas.**

GA	High SIO	Moderate SIO	Low SIO
Oglala	2,071 (1%)	1,996 (1%)	90,085 (41%)
Fall River West	2,257 (1%)	52,712 (19%)	61,929 (23%)

The recreation opportunity spectrum (ROS) for the project area is predominantly roaded natural with the exceptions of corridors along Nebraska state highway 71 and U.S. Highway 18 which are rural. The ROS classes in each GA are shown in the table below.

**Table 3-16. Acres and percent of project area in each ROS class.**

GA	Roaded Natural	Rural	Semi primitive motorized	Urban
Oglala	157,009 (72%)	13,427 (6%)	45,290 (21%)	0
Fall River West	215,950 (80%)	15,230 (6%)	40,172 (15%)	1,289 (<1%)

### ***Desired Condition***

The desired condition for recreation in the Fall River West GA is to continue to emphasize dispersed recreation opportunities and to develop interpretive signs and/or displays for the SIAs and the Crowe Dam Special Wetland/Aquatic Area.

## **Environmental Consequences**

### ***Alternative 1 – No Action: No livestock grazing***

**Direct and indirect effects:** Initially the absence of grazing would result in taller, denser vegetation which may increase habitat for big game species and thus opportunities for big game hunting and viewing. Taller, denser vegetation would also increase the nesting and brood rearing habitat for upland game species. However the short sparse vegetation required for display grounds may be lacking. Overall, this would result in little change of opportunities for upland game hunting but fewer opportunities to view upland game display activities.

Opportunities for waterfowl hunting might increase initially in areas not currently excluded from livestock, as vegetation cover around wetland areas would provide increased nesting and brood rearing habitat.

There would be no direct effects on recreation in developed sites as grazing is already excluded from the Toadstool Campground and the Hudson-Meng Research and Education Center. Dispersed recreation opportunities, including camping, hiking and equestrian use, would likely increase initially due to the absence of livestock. However, the build-up of taller, dense vegetation could result in a decrease in dispersed camping and horseback riding.

There would be no direct effect to SIOs or ROS within the project area

**Cumulative effects:** There would be minimal cumulative effects to the recreation resource from implementing alternative 1. The increase in upland vegetation and biomass under alternative 1 would cause a build-up of surface fuels and increase the likelihood of large fires which would potentially displace recreationists and reduce recreation opportunities in the area for a short duration. The 2008 travel management decision reduced motorized access and the area available for motorized dispersed camping within the project area thereby reducing the opportunities to find and utilize areas free from the presence of livestock.

Alternative 1 would increase the opportunity for motorized dispersed recreationists to find and utilize areas undisturbed by livestock which would offset the impact of travel management. There would be no cumulative effects to ROS or SIOs because there are no other activities in the project area that affect them.

### ***Alternative 2 – No Change: No change from current grazing management***

**Direct and indirect effects:** Current management practices do not appear to have a negative effect on recreational hunting opportunities. According to information found on game management agency websites for both Nebraska and South Dakota, the number of big game hunting licenses issued has increased or remained static over the last ten years. Hunting licenses for upland game have also increased with average satisfaction and success rates remaining fairly static.

There would be no direct effects on recreation within developed sites as grazing is already excluded from the Toadstool Campground and the Hudson-Meng Research and Education Center. Dispersed recreation opportunities, including camping, hiking and equestrian use, would likely remain the same. There would be no direct effect to SIOs or ROS in the project area.

As areas experiencing a downward trend in vegetation structure and diversity reach their lowest levels, opportunities for recreational activities would decrease or change focus. For instance, areas which currently provide adequate cover for upland game may change to areas more suited to prairie dogs, which would change the hunting focus for the area. However, a good range of opportunities for recreation would still exist.

**Cumulative effects:** The effects of continuing current management combined with the effects of the 2008 travel management decision could result in a potential lack of dispersed camping opportunities free from the presence of livestock. There would be no cumulative effects to ROS or SIOs because there are no other activities in the project area that affect them.

### ***Alternative 3 – Proposed Action: Grazing with adaptive management practices and associated activities***

**Direct and indirect effects:** In general, the effects of this alternative on recreation would be the same as those described for alternative 2; however, additional tools would be available to improve management.

**ROS:** Construction, reconstruction, and removal of fences in the project area would have little effect on the ROS class due to the large expanse of the area and relatively small total increase in fences dispersed throughout. The future option of sagebrush seeding or planting would be short-term and temporary so it would have no impact on ROS class.

In general, the installation and extension of pipelines would have little to no long-term effect on ROS class, and burial of pipelines would have a positive effect. Pipeline installations, extensions, and burials would be evident in the short-term but would not affect ROS class long-term.

In the Fall River West GA, the construction of three dams in the South Pasture of the Fuchs allotment would move that small area toward either a roaded modified or rural class, but would not affect the overall project area ROS class, nor would the construction of the dam within the West pasture of the Cottonwood Group allotment. Dam repairs would have no effect on ROS classes in the project area.

Installation of new tanks may move small areas from roaded natural toward either roaded modified or rural and from semi-primitive motorized toward either roaded natural or roaded modified where the installations are more concentrated. The installations across the project area are dispersed and not anticipated to have an effect on the overall ROS class of the project area. Installation of temporary tanks would be evident in the short-term, but overall would have no long-term effect on ROS class.

**SIO:** The future option of sagebrush seeding or planting would be short-term and temporary so it would have no impact on the scenic integrity objectives for the seven allotments in the Fall River West GA: Beebe-Markey, Benton, Cottonwood Group, Ellison Dam, Fossil Point, Porter, and Tubbs.

Unlike ROS, the scenic integrity objectives of small localized areas may be affected by some of the proposed improvements in alternative 3. Improvements that could affect SIO are shown in the table below.

**Table 3-17. Proposed improvements that could affect SIO in each GA.**

Improvements	Oglala GA			Fall River West GA		
	High SIO	Moderate SIO	Low SIO	High SIO	Moderate SIO	Low SIO
New fence construction (miles)	1.23		11.39	2.16	4.08	2.57
Fence removed (miles)			0.53	1.14	-	0.01
New pipeline (miles)		0.73	24.92	0.74	6.01	4.32
Pipeline extended (miles)			0.88			
Pipeline buried (miles)					3.02	1.21
New tanks (number)			25	2	11	6
New dams (number)					4	
New reservoirs (number)			2			

Approximately 21 miles of **new fence** would be constructed: 16% in areas with a high SIO, 19% in areas with a moderate SIO and 65% in areas with a low SIO. Approximately 1.7 miles of fence would be removed.

Fence construction in areas with a high SIO could reduce the SIO to moderate. However, all but 0.16 miles of these fences are proposed to protect the fossil resources in the Toadstool and Wallace Ranch SIAs. The removal of fence within the Wallace Ranch SIA would have a



positive effect on the SIO. The 0.16 miles of enclosure fence in the Oglala GA is on the boundary of the high SIO area. Relocating it outside the high SIO area boundary would minimize effects to scenic integrity.

Fence construction in areas with moderate and low SIOs would have little or no effect on the SIO of the project area due to the large project area and relatively small and dispersed effects of each fence. Approximately 2.6 miles of fence would be in moderate SIO areas; however, the fences would be constructed to protect sensitive soils in the Cottonwood Group, Simons and Fuchs allotments. The effects of fence construction, reconstruction, and removal may be reduced by minimizing the amount of fence within view of roads, avoiding silhouetting against the sky, and minimizing vegetation clearing and soil disturbance.

Approximately 36.72 miles of **new pipeline** would be installed: 2% would be installed in areas with a high SIO, 18% in areas with a moderate SIO, and 80% in areas with a low SIO.

Pipeline installations, extensions, and burials would be evident in the short-term. In the long-term, the installation and extension of pipelines would have little or no effect on SIO, and burial of current above ground pipelines would have a positive effect. The effects of pipeline installation may be reduced by minimizing the amount of soil disturbance and by re-seeding disturbed areas.

Approximately forty-four **new tanks** would be installed across the project area. Two are proposed in areas with a high SIO, eleven are in areas with a moderate SIO, and thirty one are in areas with a low SIO. Two of the tanks in high SIO areas are within SIAs: Edgemont Shark Locality and One Mile Hill. Both would have negative effects on the SIOs in those areas. Relocation of the tanks and pipelines outside the SIAs is recommended.

Four tanks are proposed in the foreground zone of areas with a moderate SIO. Although installation of these tanks would not cause the SIO to move from moderate to low, relocation of the tanks from the foreground to the middleground or background would be preferred. The visual impact of tanks may be minimized by using vegetation or landforms as screens and by keeping vegetation removal and soil disturbance to the minimum. An alternative method would be to place as much of the structure as possible at or below ground level.

Approximately four **new dams** would be constructed across the project area. All four would be constructed in areas with a moderate SIO. Construction and repair of dams would have a short-term effect on the SIO during and just after implementation due to the visual impact of disturbance of soil and vegetation. To minimize this impact, areas that require excavation or fill should be designed to blend with the form, line, color, and texture of the surrounding landscape.

**Cumulative effects:** See alternative 2 cumulative effects discussion.

## Social and Economic Resources

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### Affected Environment

This section provides a comprehensive evaluation of the existing conditions in the study area, including demographic, employment, and income trends. The demographics section includes a variety of factors that describe the local residents; those factors include population, age, education level, and ethnicity. Employment and income are reported by economic sector, which is a set of local businesses by industry, grouped together according to similarities in the goods and services offered. Assessing employment and income by sector will help identify those industries important to the economic sustainability of the region and those potentially dependent on the activities taking place on the NFS lands.

#### *Demographics*

The total population in the study area is 17,587. The population has been steadily declining since the 1970s. The population reached a peak in 1973 at 20,167; therefore, it has declined 12.8% from its peak. This is common in agricultural communities around the nation. Transitions in economic base and advancements in technology have led to declining populations in rural communities. Both Sioux County and Fall River County lost population during the decade. The population of Dawes County remained relatively steady – with a modest 1.3% growth rate. The study area lacks a major metropolitan center. In contrast to the study area, both South Dakota and Nebraska experienced population growth. However, growth in these states was below the national growth rate.

The median age of residents in the study area is approximately thirty-nine years (U.S. Census Bureau 2008). Dawes County has the youngest population, with a median age of 29.5 years. The county seat, Chadron, is the largest town in northwest Nebraska. Although Chadron is dominantly a rural community, it offers education and employment opportunities that the smaller towns in the study area do not. This helps attract and retain younger residents. Sioux and Fall River counties have median ages of 44.4 and 49.6 years, respectively. The median resident of these counties is approximately a decade older than the median resident of his/her respective state. Rural areas often have trouble attracting and retaining younger residents due to a lack of education and employment opportunities.

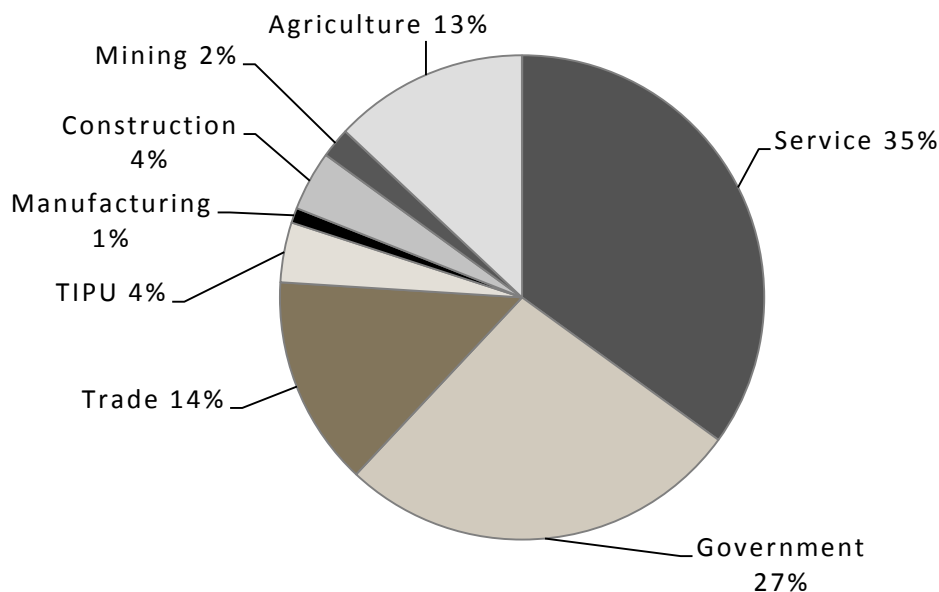
The age distribution has implications for household income. Areas with an older demographic tend to have a higher percentage of retirees and are thus less dependent on local employment conditions due to the influence of transfer payments and sources of investment income from outside the local region. Therefore, residents of Dawes County are more likely to depend on income from employment, while residents of Sioux and Fall River counties are likely to derive much of their income from non-labor sources, such as transfer payments and investment income.

#### *Employment*

The most recent U.S. Census data for employment in the study area is for the year 2000. Given the changes in population, and possible changes to industry composition, a secondary data source is utilized to report employment and income. Minnesota IMPLAN Group (MIG)

reports annual economic data for all counties in the United States. The most current IMPLAN data available is 2009, which is the data utilized throughout this analysis. MIG utilizes national, state, and local data sources to report county level employment, and includes full-time, part-time, seasonal and self-employment. IMPLAN employment data is reported simply as jobs, not full time equivalents (FTEs), thus one person with multiple jobs will show up more than once in the data. This prohibits the comparison to local population data provided by the U.S. Census.

Total employment in the study area is 9,292 jobs; 53% of that employment is in Dawes County (4,897 jobs). The largest employing sector in the study area is service, followed by government, trade, and agriculture. These sectors combined account for 89% of total employment.



**Figure 3-1. Share of employment, by industry, in the three-county study area (MIG 2009).**

Note: TIPU stands for the Transportation, Information, and Public Utilities sector

In Sioux County, nearly half (49%) of jobs are in the agriculture sector. Agricultural employment is less dominant in Dawes and Fall River counties, where it accounts for approximately 10% and 7% of employment, respectively. Nevertheless, agricultural employment as a percentage of total employment is substantially higher in both these counties than the nation (approximately 1% of total national employment is in agriculture).

Livestock ranching is the most common activity in the agriculture sector, accounting for 68% of jobs. Sioux County has the most jobs supported by livestock at 319. However, proportionately Fall River County has the largest percentage of agricultural jobs supported by livestock operations at 80%. In terms of overall economic importance, livestock supports the largest proportion of total economic base in Sioux County (36% of total employment). Losing agricultural jobs in Sioux County could be devastating to the economy because other sectors would not be able to absorb the additional labor that would enter the market. Households

would likely be forced to move in search of new employment opportunities. This is one likely cause of the decrease in population in recent years.

The counties and states maintained unemployment rates lower than the nation throughout the decade. This bodes well for the economic health of communities in the study area, which have fared better than most during the recent economic downturn. Fall River County had the highest unemployment rate in 2010 at 5.2%, which is much lower than the 9.6% experienced nationally. Fall River County has a greater economic base in the travel and tourism industries than Dawes and Sioux counties. Tourism tends to suffer during recessions, which likely caused some of the increase in Fall River County's unemployment rate. As the economy rebounds, employment in the study area should increase.

### ***Income***

Another indicator of the overall health of the local economy is income. Labor income is the sum of employee compensation and proprietors' income. The sector with the most labor income in the study area is government, accounting for 38% of the total. In contrast, government employment accounts for 27% of total jobs, which indicates that government employment is relatively high paying. Jobs in the agriculture sector are relatively low paying. Those jobs account for 13% of total employment but only 6% of total income.

Of total income in the study area, approximately 5% comes from Sioux County; Dawes and Fall River counties account for approximately 52% and 42%, respectively. In Sioux County, 51% of total labor income is earned in the agriculture sector. Agriculture has much less of an influence over the labor income of residents in Dawes and Fall River counties, accounting less than 5% of total in both counties. However, the majority of land base remains in agricultural use, and there are many ranching families whose livelihoods depend on income from that sector. Economic activity in the larger communities of Chadron and Hot Springs tend to dilute the importance of agriculture when analyzing the economic data. However, these activities remain of social consequence to the entire study area.

Of the income earned in the agriculture sector, the majority of it comes from livestock operations. Fifty percent of labor income in that sector comes from livestock. Sioux County generates the most labor income from livestock at \$5.641 million. Sioux County livestock operations account for 53% of labor income in livestock operations in the study area, and 31% of all labor income in Sioux County. These data highlight the major role that livestock operations play in the study area economy.

### ***Livestock Grazing***

Livestock grazing is an important component of the socioeconomic environment. A large portion of the land base in the study area is dedicated to agricultural use, of which livestock production is the most common activity. Many families depend on livestock grazing as a source of income; but it also supports a way of life and family traditions. During this period, Sioux County has supported between 40 and 45% of total cattle in the study area, even though Sioux County has much smaller economic and population bases than Dawes and Fall River counties. This further illustrates Sioux County's dependence on livestock as an economic driver. Ranchers in Sioux County are likely to purchase inputs to production in adjacent

counties due to Sioux County's limited economic base. Therefore, major reductions in cattle inventory in Sioux County could be detrimental to communities throughout the study area.

### ***Environmental Justice***

As stated in Executive Order 12898, all federal actions are required to consider the potential of disproportionate effects on minority and low-income populations in the local region. The principles of environmental justice require agencies to address the equity and fairness implications associated with federal land management actions.

The Council on Environmental Quality (CEQ) provides the following definitions in order to provide guidance on compliance with environmental justice requirements:

- ♦ "Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis..."
- ♦ "Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect." (CEQ 1997)

According to the U.S. Census data, the majority of the population in the study area self-identifies as white. White residents account for approximately 96%, 89%, and 89% of the population in Sioux, Dawes, and Fall River counties, respectively. Nebraska and South Dakota are slightly more diverse than the planning area (both are composed of approximately 86% white residents). American Indians account for approximately 5% of study area residents. Although this appears to be a relatively small proportion of residents, it is substantially higher than the national share (0.8% of U.S. residents identify as American Indian or Alaska Native).

Based on the minority status data presented above, environmental justice issues appear unlikely. However, even in counties with relatively small minority populations, disproportionate impacts to vulnerable groups may occur.

The poverty rate for all geographic regions increased between 2000 and 2008 as shown in the following table. Poverty rates have been on the rise nationally due to declining economic conditions. Each county has consistently had a higher poverty rate than its respective state. Dawes County experienced the highest poverty in the study area, with approximately one-fifth of county residents living in poverty in 2008. Given the high poverty rates, it is important to consider the impact of alternative development scenarios on local income and the potential effect on low income populations. The effects analysis will consider the potential for Forest Service management actions to adversely affect all area residents, with particular attention to any potential disproportionate impacts on minority and/or low-income residents.

**Table 3-18. Percent of population below the poverty level, all ages.**

	<b>2000</b>	<b>2008</b>
Dawes County, NE	15.7%	19.9%
Sioux County, NE	12.7%	13.1%
Fall River County, SD	14.4%	15.0%
Nebraska	8.9%	10.8%
South Dakota	11.4%	12.7%
United States	11.3%	13.2%

## Environmental Consequences

### *Data and Methodology*

**Economic impacts** were modeled using IMPLAN Professional Version 3.0 and the Forest Economic Analysis Spreadsheet Tool (FEAST), with 2009 data. Data on use levels under each alternative were collected from the grasslands' resource specialists. **Economic efficiency** analysis was conducted with QuickSilver Version 6. Resource specialists provided data on program revenues and program expenditures. **Social impacts** were determined by identifying how management changes may alter the conditions and trends presented in the *Affected Environment* section.

### *Assumptions*

1. The economic efficiency analysis does not provide a full accounting of all costs and benefits. The only benefits considered are program revenues (i.e., national grassland receipts). The only costs considered are direct national grassland expenditures. Therefore, the estimates of present net value do not fully account for the social costs and benefits of management actions.
2. The economic impact of grazing was estimated using authorized levels. However, actual use is permitted annually based on various factors, such as current forage conditions. Therefore, the estimated economic impact of grazing is likely to overstate the jobs and income provided.
3. The framework for the social analysis employs generalities. Area residents and national grasslands users have diverse preferences and values that may not be fully captured in the description of social consequences. Nevertheless, generalities are useful for assessing social impacts based on particular national grasslands-related interests.
4. The consumer surplus of ranchers is calculated by subtracting the sum of national grassland grazing fees (AUMs multiplied by the federal grazing fee) from the replacement cost of this forage from private providers (AUMs multiplied by private grazing fee). Consumer surplus is the difference between what ranchers are willing to pay for forage and what they are required to pay for forage.

### ***Alternative 1 – No Action: No livestock grazing***

**Direct and indirect effects:** Under alternative 1, there would be no employment or labor income from livestock grazing on the national grasslands in the project area.

Using an average private grazing fee of \$23.80 in Nebraska and South Dakota over the past three years (2008-2010), the private replacement cost of NFS-managed forage would be \$615,825 (USDA NASS 2011). In contrast, the cost of NFS-managed forage would be \$34,931 (25,875 AUMs multiplied by \$1.35 federal grazing fee). Therefore, the replacement of NFS-managed forage for private forage would cost ranchers an additional \$580,894. However, fees account for only one portion of the total cost of grazing. Rimbey and Torrell (2011) found that the cost differential between public and private grazing is not what is suggested by the grazing fees. Once they accounted for other grazing-related costs (e.g., maintenance), the cost difference was eliminated. Indeed, in their study of three western states (New Mexico, Wyoming, and Idaho) the authors found that the total cost of a public land AUM exceeds the total cost of a private land AUM. Nevertheless, it is possible that the reduction in available forage (through the elimination of grazing on the national grasslands in the project area) would increase private grazing fees, due to increased demand from ranchers seeking to replace lost forage.

As described in the *Income* section, agriculture accounts for 13% of study area employment but only 6% of study area income. This finding suggests that individuals who work in the agriculture sector have relatively low incomes. Based on this, it is reasonable to assume that the poverty rate is higher among individuals employed in the agriculture sector than those employed in other sectors (e.g., government). This raises the possibility of environmental justice consequences. The cost of elimination of grazing on the national grasslands in the project area could fall most heavily on individuals most vulnerable to economic change.

The social consequences of alternative 1 are not fully captured in the economic impact analysis. Although alternative 1 would support approximately nine fewer jobs in the study area than alternatives 2 and 3, this does not suggest that only nine individuals would be affected. All individuals (and members of their households) who rely on livestock grazing on the national grasslands would be affected. Based on the information presented in the *Introduction*, at least sixty-nine households would be affected by the elimination of grazing on the national grasslands in the project area. Socially, livestock grazing contributes to local sense of place. The project area continues to be heavily influenced by agriculture. Shifts away from agricultural land uses may challenge residents' values.

Alternative 1 has a present net value of approximately \$(522,179). The national grasslands would receive no revenue from grazing fees, but some administrative costs of rangeland management would continue.

**Cumulative effects:** As the *Affected Environment* section described, the study area counties are experiencing a number of trends that compromise their social and economic resiliency. The consequences of a loss of grazing opportunities on the national grasslands in the project area could be exacerbated by expected future conditions and trends. Recall several conditions and trends and their implications for study area residents:

- ♦ Low population density generally indicates less developed infrastructure, which contributes to social and economic isolation.
- ♦ Low (or negative) population growth signals stagnant or declining economic opportunities in the study area.
- ♦ High poverty rates and low per capita income indicate less access to capital needed to start businesses and expand economic opportunities.
- ♦ Low education rates signal lower human capital, which is an important element of social and economic well-being.
- ♦ A high median age in the study area suggests that retirees make up a large percentage of the population, which means that a smaller percentage of area residents are employed (or seeking employment) compared to the states and nation.
- ♦ The entire study area, and Sioux County (NE) in particular, are dependent on livestock grazing for employment and income.

Under all management scenarios, these trends and conditions are expected to continue. However, the effects of eliminating livestock grazing could add to the consequences of these trends to produce results that are more pronounced than predicted by the economic impact analysis. Fewer opportunities for residents to engage in agricultural activities could hasten population decline and increase poverty rates. Fewer economic opportunities in the study area would also likely contribute to the out-migration of young individuals in search of educational and employment opportunities. Fewer young and educated individuals would reduce the probability that new businesses would locate in the study area. The impact of grazing decisions under alternative 1 on these trends would likely be minimal; any decisions regarding national grassland management are unlikely to change the trajectory of these trends. Nevertheless, the removal of livestock grazing could, particularly for some individuals, magnify existing social and economic trends.

### ***Alternative 2 – No Change: No change from current grazing management***

**Direct and indirect effects:** Alternative 2 would continue current management; 25,875 AUMs would be available for grazing, and approximately \$11,000 would be spent on infrastructure improvements annually. There would be nine jobs and \$138,375 in labor income in the project area, annually.

The consumer surplus of ranchers under alternative 2 would be \$580,894 (from calculations described in alternative 1 analysis). However, maintenance and other costs may be higher on public lands relative to private lands, which could reduce (or eliminate) the consumer surplus associated with public land grazing (Rimby and Torrell 2011).

As shown in table 3-13, the present net value of alternative 2 would be \$(1,913,183). Although alternative 2 would bring in grazing revenue, the administrative costs of managing the range would increase relative to alternative 1. Therefore, the present net value of



alternative 2 is below the present net value of alternative 1. However, as the *Assumptions* section detailed, the economic efficiency analysis considers only the costs and benefits to the Forest Service. The social cost-benefit analysis could change the calculations considerably. Presumably, the social efficiency analysis would show a positive present net value of grazing on the national grasslands; otherwise ranchers would not choose to graze their livestock on them.

**Cumulative effects:** No cumulative effects are anticipated under alternative 2.

### ***Alternative 3 – Proposed Action: Grazing with adaptive management practices and associated activities***

**Direct and indirect effects:** Alternative 3 would make 25,875 AUMs available for grazing and approximately \$19,057 would be spent on infrastructure improvements annually. There would be approximately nine jobs and \$138,649 in labor income in the study area, annually.

The ranchers would be responsible for half of the cost of infrastructure improvements – approximately \$9,529 annually. This cost reduces the consumer surplus of ranchers from \$580,894 to \$571,365. As discussed in the *Assumptions* section, the consumer surplus calculations use only the difference between private and public grazing fees. The actual consumer surplus of ranchers would be influenced by other costs associated with grazing.

As shown in the economic efficiency table below, the present net value of alternative 3 would be \$(1,913,183). Alternatives 2 and 3 have the same estimated present net value. The explanation of present net value under alternative 2 also applies to alternative 3.

**Cumulative effects:** No cumulative effects are anticipated under alternative 3.

### ***Summary of Effects***

The following table shows the consequences of the alternatives on economic efficiency. As discussed in the *Assumptions* section, these calculations only consider direct costs and benefits to the national grasslands. The social costs and benefits are not included.

Alternative 1 would eliminate grazing on the grasslands, so no grazing revenues would be collected. However, alternative 1 also has lower range program costs than alternatives 2 and 3. As a result, alternative 1 has the highest present net value of the considered alternatives. Alternatives 2 and 3 are equally efficient in terms of the national grasslands' costs and benefits. Both alternatives would support approximately \$34,931 in grazing receipts and would require approximately \$133,392 in administrative costs, annually.

**Table 3-19. Economic efficiency by alternative.**

	Alternative 1	Alternative 2	Alternative 3
Annual grazing revenue	\$0	\$34,931	\$34,931
Annual administrative costs of grazing	\$45,565	\$133,392	\$133,392
Present value - benefits	\$0	\$423,310	\$423,310
Present value – costs	\$552,179	\$1,616,494	\$1,616,494
<b>Present net value</b>	<b>\$ (522,179)</b>	<b>\$ (1,193,183)</b>	<b>\$ (1,193,183)</b>

The following table provides the economic impact estimates by alternative. Alternative 1 would support neither employment nor labor income in the local economy (related to grazing on the Grasslands). Alternatives 2 and 3 would support approximately nine jobs and \$138,000 in labor income, annually.

**Table 3-20. Economic impact of national grasslands grazing in the project area.**

	Alternative 1	Alternative 2	Alternative 3
Employment	0	9	9
Labor Income	\$0	\$138,375	\$138,649

From a social and economic perspective, alternatives 2 and 3 are very similar. The present net value of the two alternatives is identical and the employment and labor income estimates vary only slightly. Both alternatives would support social values of heritage and sense of place related to livestock grazing. However, these social values could still decline as a result trends outside the control of the Forest Service.

Unlike alternatives 2 and 3, alternative 1 would have social and economic consequences that diverge from current conditions. Ranchers who currently use forage from the national grasslands would need to either replace their public land forage with private forage or reduce herd size. In addition to the reduction in employment and labor income, management changes under alternative 1 would also affect social well-being. As presented in the *Affected Environment* section, the project area is heavily dependent on agriculture in general and livestock grazing in particular. This dependence is both economic (i.e., employment and income) and social (e.g., lifestyle and heritage values). Based on the number of individuals involved in livestock grazing on the national grasslands in the project area, at least sixty-nine households would be affected by the elimination of grazing. Therefore, the number of people who could be socially and economically affected by the reduction of grazing opportunities exceeds the number of jobs that national grasslands grazing supports.

## Short-term Uses and Long-term Productivity \_\_\_\_\_

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16).

The proposed action would have short-term uses (livestock grazing) that might have impacts to different resources and uses. Some allotments might result in lower or higher vegetation structure depending on stocking rates, season of use and rotation systems. Recreationist (hunters) might find impediments (fences without strategically placed gates), while some sportsman might find areas of high vegetation cover providing a positive hunting experience. As these short-term trade-offs change from year to year or are rectified, the long-term productivity and sustainability for rangeland resources in the project area would be moving toward and meeting the desired conditions described in the LRMP. This condition would provide the public with a diverse ecological setting meeting the multiple use demand.

## Irreversible and Irretrievable Commitments of Resources

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There are no irreversible or irretrievable commitments of resources in alternatives 1 and 3. Livestock grazing under alternative could have negative effects on some rare plants and rare plant communities; however, these impacts are not anticipated to be irreversible or irretrievable.

## Cumulative Effects

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Cumulative effects are addressed in the effects analysis discussion for each issue by alternative.

## Other Required Disclosures

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NEPA regulations (40 CFR 1502.25a) direct “to the fullest extent possible, agencies shall prepare environmental impact statements concurrently with and integrated with ... other environmental review laws and executive orders.” The Forest Service consulted with the following agencies:

- ♦ Nebraska State Historic Preservation Office and South Dakota State Historic Preservation Office as required under the National Historic Preservation Act for causing ground-disturbing actions in historical places.
- ♦ U.S. Fish and Wildlife Service in accordance with the Endangered Species Act implementing regulations for projects with threatened or endangered species.
- ♦ Nebraska Department of Natural Resources and South Dakota Department of Environment and Natural Resources, in accordance with the Clean Water Act, to assess water quality issues caused by proposed actions.

The following executive orders and plans have been reviewed for compliance:

- ♦ Executive Order 12898, Environmental Justice, directs each federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The agency considered all input from person or groups regardless of age, race, income states, or other social and economic characteristics. There is no evidence that the effects attributable to livestock grazing management on federal land or the actions outlined in alternatives 2 and 3 are disproportionately high or adverse on minority populations and low-income populations when compared with the effects upon non-minority or non-low-income populations. However, there is the possibility of environmental justice consequences under alternative 1 (no livestock grazing). As described in the *Income* section, agriculture accounts for 13% of study area employment but only 6% of study area income. This finding suggests that individuals who work in the agriculture sector have relatively low incomes. Based on this, it is reasonable to assume that the poverty rate is

higher among individuals employed in the agriculture sector than those employed in other sectors (e.g., government). The cost of elimination of grazing on the national grasslands in the project area could fall most heavily on individuals most vulnerable to economic change.

- ♦ Executive Order 11990, Protection of Wetlands, directs agencies to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Known major wetland areas (as defined in section 6 (c)), have been protected or managed specifically for the protection of wetland resources in past management strategies. There is no evidence that the effects attributable to livestock grazing management in the project area or the actions outlined in any alternative would impact wetlands.
- ♦ Executive Order 11988, Floodplain Management, directs agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. This proposed action or the activities prescribed in any alternative do not modify or develop floodplains.
- ♦ Clean Air Act – the Oglala and Fall River West GAs are in the Thunder Basin airshed. The FEIS for the 2001 LRMP does not identify any emission sources in the Nebraska or South Dakota part of the airshed. Activities on the national grasslands with the potential to affect air quality are use of travelways (paved or unpaved roads and trails), oil and gas exploration and development, prescribed fire and wildfires, mining, and developed recreation (campfires). Livestock grazing under alternative 2 or 3 would not noticeably alter air quality in the airshed and therefore, would be in compliance with the Clean Air Act.

# **Chapter 4**

## **Consultation and Coordination**

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Preparers and Contributors

Agencies, Organizations and Individuals  
Contacted

Federal, State, County, and Local  
Agencies

Tribes

Organizations

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## CHAPTER 4

### CONSULTATION AND COORDINATION

#### Preparers and Contributors

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##### Interdisciplinary Team Members:

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Kelly Stover	Range	Fall River Ranger District
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Lisa Heiser	Recreation	NNFG
Leslie Horsch	Writer/Editor	Bighorn National Forest
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Carla Loop	NEPA planner; acting district ranger, decision-maker	NNFG and Pine Ridge Ranger District
Mike McNeill	District Ranger, decision-maker	Fall River Ranger District
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#### Agencies, Organizations, and Individuals Contacted\_\_\_\_\_

The Forest Service consulted the following individuals, federal, state, and local agencies; tribes; and non-Forest Service persons during the development of this environmental impact statement. A total of 93 scoping letters were sent to individuals and organizations asking for input

concerning this analysis. The mailing list is in the project record, which is on file at the Nebraska National Forests and Grasslands supervisor's office in Chadron, NE.

### **Federal, State, County, and Local Agencies:**

Senator John Thune	Senator Mike Johanns
Senator Tim Johnson	Senator Ben Nelson
Senator Leroy Loudon	Governor Dave Heineman
Lance Russell SD House of Representatives	Congressman Adrian Smith
Mike Vershio SD House of Representatives	Congresswoman Stephanie Herseth
Congressman Jeff Fortenberry	Congressman Terry Lee
Bureau of Land Management, Dickenson, ND	Bureau of Land Management, Billings, MT
Bureau of Land Management, Belle Fourche, SD	U.S. Fish and Wildlife Service, LaCreek National Wildlife Refuge
Bureau of Land Management, Wyoming State Office, Cheyenne, WY	USDA Forest Service, Rocky Mountain Forest and Range Experiment Station
USDA Natural Resources Conservation Service, Hot Springs, SD	USDA Natural Resources Conservation Service, Rapid City, SD
USDA Natural Resources Conservation Service, Huron, NE	Environmental Protection Agency, Washington D.C.
U.S. Fish and Wildlife Service, NE	Environmental Protection Agency, KS
U.S. Fish and Wildlife Service, Pierre, SD	USDA Forest Service, Washington DC
DOI, Office of Environmental Policy and Compliance, Washington DC	National Park Service, Badlands National Park, South Dakota
South Dakota State Historic Preservation Office	South Dakota Department of Environment and Natural Resources
South Dakota State Historical Society Archeological Research Center	South Dakota Department of Economic and Tourism Development
South Dakota Game, Fish and Parks	
Nebraska State Historic Preservation Office	Nebraska Game and Parks Commission
Dawes County Extension	Fall River County Commissioners
Dawes County Commissioners	Sioux County Commissioners



## Tribes

Yankton Sioux Tribe	Lower Brule Sioux Tribe
Southern Cheyenne Tribe	Standing Rock Sioux Tribe
Northern Cheyenne Tribe	Grey Eagle Society
Rosebud Sioux Tribe	Santee Sioux Nation
Flandreau Santee Sioux Tribe	Sicangu Lakota Treaty Council Office
Oglala Sioux Tribe	Ponca Tribe of Nebraska
Northern Arapaho Business Council	Winnebago Tribe of Nebraska
Cheyenne River Sioux Tribe	Omaha Tribe of Nebraska
Crow Creek Sioux Tribe	

## Organizations

Sugarloaf Grazing Association, Crawford	Soldier Creek Grazing Association, Crawford
Indian Grazing Association, Edgemont	Cottonwood Grazing Association, Edgemont
Pioneer Grazing Association, Hot Springs	
South Dakota Landowner's Rights Association	National Wild Turkey Federation-Black Hills Chapter, Rapid City, SD
Dakota Chapter American Fisheries Society	Prairie Hills Audubon Society of Western South Dakota
South Dakota Association of Conservation Districts	Black Hills Resource Conservation and Development Association
South Dakota Chapter Wildlife Society	Black Hills Sportsmen
Lewis & Clark Gem and Mineral Society	Black Hills Forest Resource Association
Sierra Club-The Black Hills Group	Muzzle Loaders of Black Hills
Izaak Walton League, Hill City, SD	Black Hills Badland and Lake Association
Reeves and Associates, Rapid City	South Dakota Stockgrower's Association
Black Hills Multiple Use Coalition	South Dakota Wildlife Federation
Nebraska Wildlife Federation, Lincoln, NE	Upper Niobrara White Natural Resources District, Chadron, NE
The Nature Conservancy, Nebraska Field Office, Omaha, NE	NW Nebraska Natural Resources Council

**Organizations, cont.**

National Wild Turkey Federation, KS

National Audubon Society

Biodiversity Conservation Alliance,  
Laramie, WY

National Wildlife Federation, Missoula, MT

National Wildlife Federation, Boulder, CO

Conservation Alliance of the Great Plains